Statement of Basis

Title V Air Quality Operating Permit

Poet Research Center, Inc. – Scotland, South Dakota

Department of Environment and Natural Resources

1.0 Background

On August 26, 1996, Broin Enterprises was initially issued a Title V air quality operating permit #28.9901-12. Broin Enterprises' initial Title V air quality operating permit #28.9901-12 expired on August 26, 2001. On February 23, 2001, the Department of Environment and Natural Resources (DENR) received a renewal application for Broin Enterprises to operate the ethanol plant.

Broin Enterprises has changed its name to Poet Research Center, Inc. On August 10, 2005, the South Dakota Department of Environment and Natural Resources (DENR) renewed Poet Research Center s Title V air quality permit for an ethanol production facility near Scotland, South Dakota. The facility consists of two major elements, a 10 million gallon per year dry corn mill ethanol production plant, and a research and development facility with an ethanol production capacity of 1.8 million gallons per year. At full capacity, Poet Research Center may produce up to 12 million gallons of undenatured ethanol per year. In addition to fuel ethanol, the corn mill ethanol plant also produces carbon dioxide (CO2) and dried distiller grain and solubles (DDGS) as saleable byproducts.

On November 15, 2010, Poet Research Center's Title V air quality permit was renewed and modified. The following actions were incorporated in the Title V air quality operating permit since it was renewed:

1. Poet Research Center has requested that Unit #2, the SA625C Superb corn dryer, be removed from the permit. The unit has not been in use for the past 5 years and POET Research Center does not foresee using it during the life of this permit.
2. Poet Research Center had also included a Tank #8 in its application. This existing tank had not been included in previous permits but will be added to this one. The tank is listed at 39,500 gallons and was constructed in 1993 and will be used to store denatured ethanol.
3. Poet Research Center has indicated that Unit #26 was not constructed as it was not necessary for the upgrade to Project BELL (production of cellulostic ethanol). Cellulose will now be received and will then be run through a chopper that will slightly reduce the size of the cellulose material. This chopping will occur within a 3-sided enclosure and will be mechanically conveyed within an enclosed conveyor directly into the pretreatment vessels
4. Also, Unit #27 was not required for the upgrade to Project BELL. Because cellulose is mechanically conveyed directly into the pre-treatment vessels, a filter receiver (baghouse) is no longer required to aspirate the pneumatic conveyance and storage silo.
5. The air quality permit lists a Unit #29, an anaerobic digestion and biogas flare. Poet Research Center installed a smaller anaerobic digester which will operate at a flow rate of 5.0 standard cubic feet per minute (0.2 MMBTU/hr). The original digester was rated at (25 standard cubic feet per minute (1.0 MM BTU/hr). The flare has not been constructed and POET Research Center has requested that DENR remove it from the permit.
6. DENR will remove Units #26, #27 and delete the requirements for a flare for Unit #29 from the list of permitted units.

Poet Research Center proposed to add an additional fiber processing and packaging system to its facility. The proposed facility will include a fiber dryer controlled by a baghouse and three other miscellaneous processes controlled by filters or baghouses. This fiber processing addition will initially take approximately 60% of the fiber produced from the existing fractionation facility for additional processing and could someday take up to 100% of the fractionation facility fiber stream.

1.1 Existing Equipment

Table 1-1 shows Poet Research Center's existing equipment from its Title V air quality operating permit issued November 15, 2012.

Table #1-1 - Description of Permitted Units, Operations, and Processes

Identification	Description	Maximum Operating Rate	Control Device
Unit #1	Grain receiving, grain transfer, and storage bin loading. Trucks transport corn to the ethanol plant and dump corn into a receiving pit located in a partially enclosed building. Elevator legs transport the corn from the receiving pit to grain storage bins.	100 tons of grain per hour	Not applicable
Unit #3	Germ and fiber fractionation system. An elevator leg transports the corn from the storage bins to the germ fractionation system. This system separates the germ from the rest of the corn. The corn is then transported to the fiber fractionation system. This system separates the fiber from the rest of the corn.	15 tons of grain per hour	A separate baghouse controls emissions from each system. Exhaust gases from both baghouses are routed through a common stack.
Unit #4	Fiber and germ conveyor system. The fiber and germ are transported to the wet distillers grains storage area.	2.3 tons of fiber and/or germ per hour	Baghouse
Unit #5	Fluid bed germ dryer and cooler system. The dryer is fired with natural gas. A multicyclone collects the dried germ.	1.3 tons of dried germ per hour and 2.4 million Btus per hour heat input	Not applicable
Unit #6	Grain milling. An elevator leg transports the fractionated grain or whole grain from the surge bin to a 2003 Roskamp Champion hammer mill. The hammer mill grinds the fractionated grain or whole grain	15 tons of grain per hour	Baghouse

Identification	Description	Maximum Operating Rate	Control Device
	into flour.		
Unit #7	Grain milling. An elevator leg transports the fractionated grain or whole grain from the surge bin to a 1998 Bliss hammer mill, model # 2636. The hammer mill grinds the fractionated grain or whole grain into flour.	12 tons of grain per hour	Baghouse
Unit #8	Fermentation system. Ethanol is produced from the fermentation process. The fermentation process occurs in five fermenters and the liquid beer is stored in a beer well.	42 tons of corn mash, yeast, and/or water per hour	Wet scrubber
Unit #9	Pilot plant fermentation system. Ethanol is produced from the fermentation process. The fermentation process occurs in five fermenters and the liquid beer is stored in a beer well.	9 tons of corn mash, yeast, and/or water per hour	Wet scrubber
Unit #10	Carbon dioxide recovery system. The air emissions from the fermentation process (Unit #8) are routed through a 1997 Salof Refrigeration Company carbon dioxide skid. There are three emission points: the side stripper vent, the carbon bed drier, and the alumina bed drier	Not applicable	Not applicable
Unit #11	Distillation process. The distillation process distills the liquid beer. The distillation process consists of the beer stripper, rectifier, side stripper, molecular sieve, and evaporator.	31 tons of beer (ethanol, mash, and/or water) per hour	Wet scrubber
Unit #12	A rotary drum dryer. The dryer is fired with natural gas. The dried distiller grain is collected by multi cyclones.	4.5 tons of dried distillers grain per hour and 17 million Btus per hour heat input	Not applicable
Unit #13	Dried distillers grain cooling drum. The dried distillers grain is cooled in this system prior to storage.	4.5 tons of dried distillers grain per hour	Not applicable
Unit #14	Dried distillers grain shipping. The dried distillers grain is loaded out be trucks and railcar. The loadout	100 tons of dried distillers grain per hour	Not applicable

Identification	Description	Maximum Operating Rate	Control Device
	occurs in a partially enclosed building		
Unit #15	Ethanol truck and railcar loadout(s)	24,000 gallons per hour	Not applicable
Unit #16	Seven industrial cooling towers	Not applicable	Not applicable
Unit #17	Boiler #1 – 1977 Cleaver-Brooks steam boiler, model # CB-200-700, fired with natural gas and propane.	29.3 million Btus per hour heat input	Not applicable
Unit #18	Boiler #2 – 2003 Superior Boiler Works steam boiler, model # 6_X-3500-S300-ICCF-G, fired with natural gas and propane.	29.3 million Btus per hour heat input	Not applicable
Unit #19	Tank #2 – A fixed roof above ground storage tank. The tank will store 190-proof ethanol.	30,000 gallons	Not applicable
Unit #20	Tank #3 – A fixed roof above ground storage tank. The tank will store 200-proof ethanol.	25,000 gallons	Not applicable
Unit #21	Tank #4 – A fixed roof above ground storage tank. The tank will store 190-proof ethanol.	30,000 gallons	Not applicable
Unit #22	Tank #5 – A fixed roof above ground storage tank. The tank will store denatured ethanol	39,500 gallons	Not applicable
Unit #23	Tank #6 – A fixed roof above ground storage tank. The tank will store denatured ethanol	39,500 gallons	Not applicable
Unit #24	Tank #7 – A fixed roof above ground storage tank. The tank will store denatured ethanol	39,500 gallons	Not applicable
Unit #25	Cellulose receiving, cellulose transfer, and storage silo loading. Trucks transport cellulose to the ethanol plant and dump the screened cobs into a receiving hopper. A bucket elevator transports the cellulose from the receiving hopper to the storage silo, then to the mill feed bin. Fiber from Unit #3 may also be transferred to the feed bin.	20 tons of cellulose per hour	Not applicable
Unit #28	Cellulose pretreatment and fermentation. Ground cellulose and	195 pounds of cellulose/fiber solids	Wet Scrubber

Identification	Description	Maximum Operating Rate	Control Device
	fiber are dropped through the transfer filter separator into two pretreatment vessels. A screw conveyor transfers the cellulose/fiber mixture to six fermentation tanks. The liquid beer is transferred to the beer well associated with Unit #9.	mix per hour	
Unit #30	Tank #8 – A fixed roof above ground storage tank. The tank will store denatured ethanol	39,500 gallons	Not applicable

1.2 Proposed Revisions

On August 17, 2012, DENR received an application from Poet Research Center to revise its Title V air operating permit by requesting:

1. Addition of Units #31, #32, #33, and #34. DENR issued a construction permit for Units #31 through #34 on November 29, 2010 and revised the construction permit on January 13, 2011. The units were constructed and began operating on August 15, 2011.
2. Inclusion of NSPS VVa requirements. As requested during the Title V renewal application process which took place in 2010, Poet Research Center is requesting that NSPS Applicability requirements be amended to require that volatile organic compound leak detection procedures be conducted in accordance with 40 CFR 60. 480a-.489a, "Standard of performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for Which Construction, Reconstruction, or Modifications Commenced After November 7, 2006"- Subpart VVa.
3. Removal of Section 21.0 (Flare Operational Requirements) of the Current Title V: As requested during the Title V renewal application process which took place in 2010, Poet Research Center requested the removal of Unit #29 (Biogas Flare). Unit #29 was removed from the Title V permit however; Section 21.0 which identifies flare operational requirements is still part of the Title V permit. Poet Research Center is requesting that this section be removed from the Title V permit as there are no flares at the facility.

Table 1-2 shows Poet Research Center's equipment associated with its air quality construction permit issued January 13, 2011.

Identification	Description	Maximum Operating Rate	Control Device
Unit #31	Pneumatic Conveyance System	0.5 tons fiber per hour	Baghouse
Unit #32	Natural Gas fired fiber dryer	2.5 MMBtu per hour	Baghouse
Unit #33	Surge bin	0.3 tons fiber per hour	Baghouse
Unit #34	Fiber mill and packaging system	0.3 tons fiber per hour	Baghouse

2.0 New Source Performance Standards

DENR reviewed the New Source Performance Standards listed in 40 CFR Part 60 to determine if any of the federal New Source Performance Standards are applicable to this facility. The following may be applicable.

2.1 Standards for Grain Elevators

The provisions under 40 CFR Part 60 Subpart DD is applicable to the following grain elevators:

1. The provisions of this subpart are applicable to any grain terminal elevator, which has a permanent grain storage capacity of 2,500,000 bushels. A grain terminal storage elevator means any grain elevator except those located at animal food manufacturers, pet food manufactures, cereal manufacturers, breweries, and livestock feedlots; or
2. The provisions of this subpart are applicable to any grain storage elevator, which has a permanent grain storage capacity of 1,000,000 bushels. A grain storage elevator means any grain elevator located at any wheat flour mill, wet corn mill, dry corn mill (human consumption), rice mill, or soybean oil extraction plant; and
3. Commences construction, modification, or reconstruction after August 3, 1978.

Poet Research Center is considered a grain terminal elevator. The permanent grain storage capacity for this plant is 338,750 bushels, which is less than 2,500,000 bushels. Therefore, this NSPS does not apply to Poet Research Center.

2.2 Standards for Synthetic Organic Chemical Manufacturing Industries

There are two New Source Performance Standards for synthetic organic chemical manufacturing industries. The two standards are applicable to the following:

1. 40 CFR Part 60, Subpart VV is applicable to affected facilities in the synthetic organic chemical manufacturing industry, of which ethanol is included; and commence construction, reconstruction or modification after January 5, 1981, but before November 8, 2006 and the capacity of the plant is more than 1,000 megagrams per year of ethanol; and
2. 40 CFR Part 60, Subpart VVa is applicable to affected facilities in the synthetic organic chemical manufacturing industry that commence construction, reconstruction, or modification after November 7, 2006 and the capacity of the plant is more than 1,000 megagrams per year of ethanol.

It has already been determined in previous reviews that POET Research Center is subject to 40 CFR Part 60, Subpart VV. This subpart is applicable because construction commenced after January 5, 1981, and the capacity of the plant is more than 1,000 megagrams per year of ethanol.

POET Research Center requested that DENR incorporate the requirements in Subpart VVa instead of Subpart VV. The requirements in Subpart VVa are equivalent to or more stringent than those in Subpart VV. Therefore, DENR will incorporate the applicable requirements in Subpart VVa as requested.

2.3 Other Applicable New Source Performance Standards

DENR reviewed the other New Source Performance Standards and determined there are no other standards applicable to the proposed changes requested by POET Research Center.

3.0 New Source Review

In accordance with ARSD 74:36:10:01, the new source review regulations apply to areas of the state which are designated as nonattainment pursuant to the Clean Air Act for any pollutant regulated under the Clean Air Act. This facility is located in Scotland, South Dakota, which is in attainment or unclassifiable for all the criteria air pollutants regulated under the Clean Air Act. Therefore, POET Research Center is not subject to new source review.

4.0 Prevention of Significant Deterioration

A prevention of significant deterioration (PSD) review applies to new major stationary sources and major modifications to existing major stationary sources in areas designated as attainment under Section 107 of the Clean Air Act for any regulated air pollutant. The following is a list of regulated air pollutants under the PSD program:

1. Total suspended particulate (PM);
2. Particulate with a diameter less than or equal to 10 microns (PM10);
3. Particulate with a diameter less than or equal to 2.5 microns (PM2.5);
4. Sulfur dioxide (SO_2);
5. Nitrogen oxides (NOx);
6. Carbon monoxide (CO);
7. Ozone – measured as volatile organic compounds (VOCs);
8. Lead;
9. Fluorides
10. Sulfuric acid mist;
11. Hydrogen sulfide;
12. Reduced sulfur compounds;
13. Total reduced sulfur; and
14. Greenhouse gases (carbon dioxide, methane, nitrous oxide, etc.).

If the source is considered one of the 28 named PSD source categories listed in Section 169 of the federal Clean Air Act, the major source threshold is 100 tons per year of any regulated air pollutant, except for greenhouse gases. The major source threshold for all other sources is 250 tons per year of any regulated air pollutant, except for greenhouse gases.

The Environmental Protection Agency (EPA) recently published and implemented a final rule that no longer lists ethanol plants as a chemical manufacturing plant. Therefore, POET Research Center is not classified as a chemical manufacturing plant or one of the 28 listed source categories for PSD regulations and the major source threshold is 250 tons per year, except for greenhouse gases.

According to the Clean Air Act, once a pollutant is regulated under any part of the Act, (as was the case with greenhouse gas emissions after the motor vehicle regulations were finalized in March 2010) major new sources or major modifications are subject to the PSD program and Title V air quality operating permit program. Under the Clean Air Act, PSD and Title V air quality operating permits are required for all sources that emit a regulated air pollutant above 100 or 250 tons per year, depending on the source. This threshold, if applied to greenhouse gases, would greatly increase the number of facilities requiring a PSD review or Title V air quality operating permit. Based on administrative necessity, EPA increased these thresholds through the "Tailoring Rule."

On May 13, 2010, EPA issued the final version of the "Tailoring Rule" for greenhouse gas emissions. The major source threshold for greenhouse gases is listed below:

1. New PSD source because of a criteria air pollutant, the major source threshold for greenhouse gases is 75,000 tons per year of carbon dioxide equivalent or more;
2. New PSD source if greenhouse gas emissions are 100,000 tons per year of carbon dioxide equivalent or more;
3. For an existing PSD source because of a criteria air pollutant, a major modification for greenhouse gases is an increase of 75,000 tons per year of carbon dioxide equivalent or more;
4. For an existing non-PSD source that has the potential to emit 100,000 tons per year of carbon dioxide equivalent emissions or more, a major modification for greenhouse gases is an increase of 75,000 tons per year of carbon dioxide equivalent or more; and
5. In addition to subsection (2) and (4), a specific greenhouse gas, without calculating the carbon dioxide equivalent, also needs to emit greater than 100 or 250 tons per year, whichever is applicable, to be regulated.

4.1 Current Short Term and Operational Limits

POET Research Center has requested federally enforceable permit conditions to ensure actual emissions from the ethanol plant do not exceed the major source threshold under the PSD program. POET Research Center has proposed to use a combination of control equipment, time constraints on certain units, and short term emission limits for each unit to maintain actual air emissions below the major source threshold under the PSD program.

The current Title V air quality operating permit contains enforceable permit conditions to ensure actual emissions from the ethanol plant do not exceed the major source threshold under the PSD program. POET Research Center has short term emission limits that restrict the facility's potential emissions to less than 238 tons per year for the plant for the criteria air pollutants identified in Table 4-1. The permit also contains a plant wide emission limit for each criteria air pollutant listed in Table 4-1 of 238 tons per 12-month rolling total. Table 4-1 lists POET Research Center's short term emission limits as derived from chapter 7.0 of the existing Title V air quality operating permit issued in November 2010 and chapter 5.0 of the construction permit issued in January 2011.

Table 4-1 – Current Short Term Emission Limits

Unit #	Description	CO	TSP	SO_2	NO_X	VOC
3	Fractionation		0.01 [2]			
4	Germ/Fiber Conveyor		0.01 [2]			

6	Hammer mill		0.01 [2]			
7	Hammer mill		0.01 [2]			
8	Fermentation Process					18.0[1]
9	Pilot Plant Fermentation					2.8[1]
11	Distillation					0.9[1]
12	Distillers Grain Dryer					24.9[1]
28	Pilot Plant Fermentation					0.3[1]
31	Fiber filter receiver		0.01 [2]			
32	Natural gas fired fiber dryer		0.01 [2]			
33	Surge bin		0.01 [2]			
34	Fiber mill and packaging system		0.01 [2]			

1- Pounds per hour
2- Grains per dry standard cubic foot

4.2 Potential Emissions

DENR will use the short term limits and operational limits to calculate potential emissions. When short term and operational limits are not applicable, DENR uses stack test results to determine air emissions whenever stack test data is available from the source or a similar source. When stack test results are not available, DENR relies on manufacturing data, material balance, EPA's Compilation of Air Pollutant Emission Factors (AP-42, Fifth Edition, Volume 1) document, the applicant's application, or other methods to determine potential air emissions.

Table 4-2 summarizes the potential controlled emissions for Poet Research Center. The potential emissions were derived from the statement of basis associated with the November 2010 Title V operating permit and the November 2010 construction permit.

Table #4-2 - Potential Controlled Emissions (tons per year)

Unit #	Description	TSP	PM10	SO_2	NO_X	VOC	HAP	CO
1	Grain Receiving[3]	11.8	3.9					
3	Fractionation [3]	19.3	19.3					
4	Germ/Fiber Conveyor [3]	0.4	0.4					
5	Germ Dryer[3]	1.3	0.3	0.0	1.1	8.8	0.0	5.3
6	Hammer mill[3]	3.0	3.0					
7	Hammer mill [3]	1.6	1.6					
8	Fermentation Process[3]					10.1	2.6	
9	Pilot Plant Fermentation[3]					2.6	0.9	
11	Distillation[3]					6.1		
12	Distillers Grain Dryer[3]	7.4	4.4	0.0	7.3	109.1	4.4	39.4
13	Cooling Drum[3]	8.3	8.3			9.6		
14	Dried Distillers Loadout[3]	0.2	0.2					
15	Ethanol Loadout[3]					2.4		
17	Boiler #1 [1, 3]	1.0	1.0	0.3	26.6	0.7	0.2	10.8
18	Boiler #2 [1, 3]	1.0	1.0	0.3	26.6	0.7	0.2	10.8

Unit #	Description	TSP	PM10	SO_2	NO_X	VOC	HAP	CO
	Tank #1[2]					2.0		
19	Tank #2[2]					0.4		
20	Tank #3[2]					0.4		
21	Tank #4[2]					0.4		
22	Tank #5[2]					0.6		
23	Tank #6[2]					0.6		
24	Tank #7[2]					0.6		
25	Cellulose Receiving[3]	1.2	0.4					
28	Pilot Plant Fermentation[3]					1.3	0.0	
31	Pneumatic System[3]	0.1	0.1					
32	Fiber Dryer[3]	1.2	1.2	0.0	0.8	2.2	0.0	0.7
33	Fiber Surge Bin[3]	0.2	0.2					
34	Fiber Mill & Packaging[3]	1.9	1.9					
	Tank #8[2]					0.6		
	Centrifuges[3]					3.6		
	Equipment Leaks [2]					12.7		
	10 natural gas heaters[3]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Fugitive Dust[2]	10.6	3.0					
	Total Emissions	**71**	**50**	**1**	**63**	**176**	**8**	**67**

[1] – This boiler is capable of burning natural gas or propane. The air emissions in this table represent the fuel that would emit the greatest amount of the particular pollutant.
[2] – The emissions were obtained from the application
[3]- The emissions were obtained from the previous statement of basis

4.3 Potential to Emit for Greenhouse Gases

POET Research Center is considered an existing non-PSD source due to air emission and operational limits in their existing Title V air quality operating permit. The next step is to determine if POET Research Center has the potential to emit 100,000 tons per year of carbon dioxide equivalent emissions or more. There are six regulated greenhouse gases which are listed below:

1. Carbon dioxide;
2. Nitrous oxide;
3. Methane;
4. Hydrofluorocarbons;
5. Perfluorocarbons; and
6. Sulfur hexafluoride.

On July 20, 2011, EPA promulgated a final rule (Federal Register Volume 76, Number 139 page 43490) that deferred the regulation of biogenic greenhouse gases for 3 years. Therefore the biogenic greenhouse gas emissions such as the carbon dioxide generated during the fermentation process associated with the facility will not be considered for applicability. The applicability will be based on the use of fossil fuel.

POET Research Center operates two boilers and a dryer with a combined maximum heat input value of 61 million Btus per hour (i.e. 29.3 + 29.3 + 2.5 = 61). The greenhouse gas emission factors for firing these units with natural gas are from AP-42, Table 1.4-2, July 1998 and are listed below:

1. Carbon dioxide = 120,000 pounds per million cubic feet;
2. Nitrous oxide = 2.2 pounds per million cubic feet;
3. Methane = 2.3 pounds per million cubic feet.

Equation 4-1 is used to calculate the annual quantity of natural gas that can be burned both units.

Equation 4-1 – Annual natural gas use

$$Potential\ (\frac{MMcf}{year}) = 61\ \frac{MMBtus}{hour} * 8{,}760 \frac{hours}{year} \div 1{,}020\ \frac{Btus}{cf}$$

The annual quantity of natural gas consumed is 523 million cubic feet per year.

Using Equation 4-2, the appropriate emission factors and operating rates were used to determine the potential greenhouse gas emissions from the two boilers. In the case of the greenhouse gases, the result of Equation 4-2 needs to be multiplied by 1, 310, and 21 for carbon dioxide, nitrous oxide, and methane, respectively, to convert the results to carbon dioxide equivalent. The potential emissions for the greenhouse gases are summarized in Table 4-3.

Equation 4-2 – Potential greenhouse gas emissions

$$Potential\ \left(\frac{tons}{year}\right) = 523\ \left(\frac{MMcf}{year}\right) * Emission\ Factor\ \left(\frac{pounds}{MMcf}\right) \div 2000 \frac{pounds}{ton}$$

Table 4-3 – Fuel Usage Greenhouse Gas Potential Emissions (tons per year)

Pollutant	Potential Emissions	Potential Carbon Dioxide Equivalent
Carbon Dioxide	31,380	31,380
Nitrous Oxide	0.6	186
Methane	0.6	13
	Total	31,579

Not considering any other greenhouse gas emissions from other sources POET Research Center is considered an existing non-PSD source with the potential to emit less than 100,000 tons per year of carbon dioxide equivalent emissions. Therefore, POET Research Center is not considered a major source for greenhouse gases under the PSD program and future proposed changes will have to be reviewed to determine if they would be considered a major modification under the PSD program.

5.0 National Emission Standards for Hazardous Air Pollutants

DENR reviewed the National Emission Standards for Hazardous Air Pollutants (NESHAP) in 40 CFR Part 61 and determined that there are no NESHAP standards applicable to POET Research Center by the addition of the fiber processing and packaging units.

6.0 Maximum Achievable Control Technology Standards

6.1 Potential HAP Emissions

The federal Maximum Achievable Control Technology Standards are applicable to both major and area sources of hazardous air pollutants. A major source of hazardous air pollutants is defined as having the potential to emit 10 tons or more per year of a single hazardous air pollutant or 25 tons per year or more of a combination of hazardous air pollutants. An area source is a source that is not a major source of hazardous air pollutants.

DENR reviewed the Maximum Achievable Control Technology Standards and determined the following may be applicable to POET Research Center as an area source of hazardous air pollutants.

6.2 Industrial Process Cooling Towers

The national emission standard for industrial process cooling towers in 40 CFR Part 63 Subpart Q prohibits the use of chromium based water treatment chemicals in industrial process cooling towers. In accordance with 40 CFR § 63.400, this subpart is only applicable to major sources of hazardous air pollutants. POET Research Center is considered an area source of hazardous air pollutants and not subject to this subpart. The current Title V air quality operating permit contains language associated with this Subpart. DENR will remove this language from the permit while we are making changes.

6.3 Other MACT Standards

DENR reviewed the other Maximum Achievable Control Technology Standards and determined that none are applicable to the proposed changes at POET Research Center.

7.0 State Requirements

Any source operating in South Dakota that meets the requirements of the Administrative Rules of South Dakota (ARSD) 74:36:05:03 is required to obtain a Title V air quality operating permit. POET Research Center's potential to emit is greater than the major source threshold under the Title V air quality permit program and POET Research Center must comply with federal new source performance standards and maximum achievable control technology standards. Therefore, POET Research Center is required to obtain a Title V air quality operating permit.

7.1 State Particulate Emission Limits

ARSD 74:36:06:02(1) and 74:36:06:03(1), establish state emission limits for total suspended particulate matter. In addition, ARSD 74:36:12:01 establishes a visible emission limit of 20 percent opacity for each unit.

The dryer's emission limit was calculated by using equations for process industry units (ARSD 74:36:06:03) instead of using the equation for fuel burning units (ARSD 74:36:06:02). Burning of fuel is not the only cause of emissions in the dryers. For example, the particulate emissions are generated from the burning of the fuel and the drying process of dried distiller grain with

solubles. The equation for fuel burning units was not derived for units that produce emissions besides the burning of fuel. Therefore, the dryers will be classified as a process unit.

Equation 7-1 – State total suspended particulate emission limit for process weights less than 30 tons per hour.

Equation 7-1 – Particulate Limit Calcualtion

$$E_{TSP}\ \frac{lbs}{hour} = \left(4.10 \times P^{0.67}\right)$$

Where: P is the process weight rate in tons per hour.

Using the process rate for the pneumatic system (0.5 tons per hour), the fiber dryer (0.7 tons per hour), the fiber surge bin (0.3 tons per hour), and the fiber mill (0.3 tons per hour) in Equation 7-1, the particulate matter emission limit was calculated and compared to potential emissions in Table 7-1. The potential emissions were derived from the statement of basis for the November 2010 construction permit.

Table 7-1 – Comparison of Allowable Emissions to Potential Emissions Particulate

Source	Pounds per Hour	
	Allowable Emissions	**Potential Emissions**
Unit #31	2.6	0.011
Unit #32	3.2	0.279
Unit #33	1.8	0.026
Unit #34	1.8	0.214

7.2 State Sulfur Dioxide Emission Limits

In accordance with ARSD 74:36:06:02(2), a fuel burning unit with heat input may not emit sulfur dioxide emissions to the ambient air in an amount greater than 3.0 pounds per million Btus. The fiber dryer is fired with natural gas which has negligible sulfur content and capable of meeting the state's sulfur dioxide emission limit. Table 7-2 below compares the potential and allowable emissions.

Table 7-2 – Comparison of Allowable Emissions to Potential Emissions Sulfur Dioxide

Source	lbs/MMBtu	
	Allowable Emissions	**Potential Emissions**
Fiber Dryer	3.0	0.0006

Based on the potential emissions and limits in Table 7-1 and 7-2, POET Research Center's fiber dryer is capable of operating within the states emission limits.

7.3 Compliance Assurance Monitoring

Compliance assurance monitoring is applicable to permit applications received on or after April 20, 1998, from major sources applying for a Title V air quality operating permit. POET Research Center's renewal application was received on August 17, 2012. Therefore, compliance assurance monitoring is applicable to any unit that meets the following criteria:

1. The unit is subject to an emission limit or standard for the applicable regulated air pollutant;
2. The unit uses a control device to achieve compliance with such emission limit or standard; and
3. The unit has potential uncontrolled emission of the applicable regulated air pollutant that are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source.

The facility's existing fermentation process, plant distillation process, and distillers grain dryer are the only units that have potential uncontrolled volatile organic compound emission greater than 100 tons per year. Compliance assurance monitoring does not apply to Units #31 through #34.

7.4 Periodic Monitoring

Periodic monitoring is required for each emission unit that is subject to an applicable requirement at a source subject to the Title V air quality operating permit program. Unit's #31 through #34 at this facility are required to meet opacity, particulate matter, and sulfur dioxide Periodic monitoring will be based on the following:

1. Units #31 through #34 are subject to periodic monitoring for particulate. Periodic monitoring for the units may consist of visible emission readings, pressure drop readings for the appropriate control device, or implementation of a maintenance plan for the appropriate control device. A permit condition will be placed in the permit requiring POET Research Center to perform periodic visible emission readings. The periodic visible emission readings will be used to demonstrate compliance on a periodic basis.

2. Unit #32 is also subject to periodic monitoring for sulfur dioxide emissions. The periodic monitoring for sulfur dioxide emissions normally consists of the sulfur content of the fuel fired in the units. Since the fuel being used is natural gas periodic monitoring for sulfur dioxide is not required.

7.5 Air Fees

Sources subject to the Title V air quality operating permit program are subject to an annual air quality fee. The fee consists of an administrative fee and a per ton fee based on the actual tons per year of pollutant emitted. The pollutants charged for are particulate matter, sulfur dioxides, nitrogen oxides, volatile organic compounds, and hazardous air pollutants. The actual emissions are calculated by DENR based on operational information provided by the source.

7.6 Completed Construction Permit Requirements

Poet Research Center was required to conduct one-time requirements in its January 2011 construction permit. By completing these requirements, those requirements are not required to be included in the Title V air quality operating permit. A summary of those conditions are as follows:

Permit condition 4.2 required the owner or operator to submit the date construction commended on the fiber processing system. Poet Research Center submitted the commence construction notification in March 2011 and;
Permit condition 4.3 required the owner or operator to submit the date initial startup of the fiber processing system occurred. Poet Research Center submitted the initial startup notification in August 2011.

8.0 Recommendation

Based on the information submitted in the air permit application, DENR considers the proposed changes to the permit as a permit modification. With the proposed changes POET Research Center will be exempt from a PSD review for particulate matter and volatile organic compounds. The drafted changes to the permit are included in Appendix A.

Poet Research Center's proposed changes will be required to construct and operate within the requirements stipulated in the following regulations:

- ✓ ARSD 74:36:05 - Operating Permits for Part 70 Sources;
- ✓ ARSD 74:36:06 - Regulated Air Pollutant Emissions;
- ✓ ARSD 74:36:11 - Performance Testing;
- ✓ ARSD 74:36:12 - Control of Visible Emissions;
- ✓ ARSD 74:36:13 - Continuous emission monitoring systems.

Any questions pertaining to this permit recommendation should be directed to Ashley Brakke, Engineer I.

APPENDIX A
PERMIT MODIFICATION

The following changes to the existing permit represent changes that meet the definition of a permit modification. Additions to the existing permit are represented in blue, bold, and underline and deletions are represented in red with overstrikes. In the case where permit conditions are deleted or added between permit conditions, the permit conditions will be renumbered appropriately when the permit is issued.

1.0 STANDARD CONDITIONS

1.1 Operation of source. In accordance with Administrative Rules of South Dakota (ARSD) 74:36:05:16.01(8), the owner or operator shall operate the units, controls, and processes as described in Table 1-1 in accordance with the statements, representations, and supporting data contained in the complete permit application submitted and dated March 23, 2010, **and August 17, 2012,** unless modified by the conditions of this permit. Except as otherwise provided herein, the control equipment shall be operated in a manner that achieves compliance with the conditions of this permit at all times. The application consists of the application forms, supporting data, and supplementary correspondence. If the owner or operator becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in an application, such information shall be promptly submitted.

Table #1
Description of Permitted Units, Operations, and Processes

Identification	Description	Maximum Operating Rate	Control Device
Unit #1	Grain receiving, grain transfer, and storage bin loading. Trucks transport corn to the ethanol plant and dump corn into a receiving pit located in a partially enclosed building. Elevator legs transport the corn from the receiving pit to grain storage bins.	100 tons of grain per hour	Not applicable
Unit #3	Germ and fiber fractionation system. An elevator leg transports the corn from the storage bins to the germ fractionation system. This system separates the germ from the rest of the corn. The corn is then transported to the fiber fractionation system. This system separates the fiber from the rest of the corn.	15 tons of grain per hour	A separate baghouse controls emissions from each system. Exhaust gases from both baghouses are routed through a common stack.
Unit #4	Fiber and germ conveyor system. The fiber and germ are transported to the wet distiller grains storage area.	2.3 tons of fiber and/or germ per hour	Baghouse
Unit #5	Fluid bed germ dryer and cooler	1.3 tons of dried	Not applicable

Identification	Description	Maximum Operating Rate	Control Device
	system. The dryer is fired with natural gas. A multi cyclone collects the dried germ.	germ per hour and 2.4 million Btus per hour heat input	
Unit #6	Grain milling. An elevator leg transports the fractionated grain or whole grain from the surge bin to a 2003 Roskamp Champion hammer mill. The hammer mill grinds the fractionated grain or whole grain into flour.	15 tons of grain per hour	Baghouse
Unit #7	Grain milling. An elevator leg transports the fractionated grain or whole grain from the surge bin to a 1998 Bliss hammer mill, model # 2636. The hammer mill grinds the fractionated grain or whole grain into flour.	12 tons of grain per hour	Baghouse
Unit #8	Fermentation system. Ethanol is produced from the fermentation process. The fermentation process occurs in five fermenters and the liquid beer is stored in a beer well.	42 tons of corn mash, yeast, and/or water per hour	Wet scrubber
Unit #9	Pilot plant fermentation system. Ethanol is produced from the fermentation process. The fermentation process occurs in five fermenters and the liquid beer is stored in a beer well.	9 tons of corn mash, yeast, and/or water per hour	Wet scrubber
Unit #10	Carbon dioxide recovery system. The air emissions from the fermentation process (Unit #8) are routed through a 1997 Salof Refrigeration Company carbon dioxide skid. There are three emission points: the side stripper vent, the carbon bed drier, and the alumina bed drier	Not applicable	Not applicable
Unit #11	Distillation process. The distillation process distills the liquid beer. The distillation process consists of the beer stripper, rectifier, side stripper, molecular sieve, and evaporator.	31 tons of beer (ethanol, mash, and/or water) per hour	Wet scrubber
Unit #12	A rotary drum dryer. The dryer is fired with natural gas. The dried distiller grain is collected by multi cyclones.	4.5 tons of dried distillers grain per hour and 17 million Btus per hour heat input	Not applicable

Identification	Description	Maximum Operating Rate	Control Device
Unit #13	Dried distillers grain cooling drum. The dried distiller grain is cooled in this system prior to storage.	4.5 tons of dried distillers grain per hour	Not applicable
Unit #14	Dried distillers grain shipping. The dried distillers grain is loaded out be trucks and railcar. The load out occurs in a partially enclosed building	100 tons of dried distillers grain per hour	Not applicable
Unit #15	Ethanol truck and railcar load out(s)	24,000 gallons per hour	Not applicable
Unit #16	Seven industrial cooling towers	Not applicable	Not applicable
Unit #17	Boiler #1 – 1977 Cleaver-Brooks steam boiler, model # CB-200-700, fired with natural gas and propane.	29.3 million Btus per hour heat input	Not applicable
Unit #18	Boiler #2 – 2003 Superior Boiler Works steam boiler, model # 6_X-3500-S300-ICCF-G, fired with natural gas and propane.	29.3 million Btus per hour heat input	Not applicable
Unit #19	Tank #2 – A fixed roof above ground storage tank. The tank will store 190-proof ethanol.	30,000 gallons	Not applicable
Unit #20	Tank #3 – A fixed roof above ground storage tank. The tank will store 200-proof ethanol.	25,000 gallons	Not applicable
Unit #21	Tank #4 – A fixed roof above ground storage tank. The tank will store 190-proof ethanol.	30,000 gallons	Not applicable
Unit #22	Tank #5 – A fixed roof above ground storage tank. The tank will store denatured ethanol	39,500 gallons	Not applicable
Unit #23	Tank #6 – A fixed roof above ground storage tank. The tank will store denatured ethanol	39,500 gallons	Not applicable
Unit #24	Tank #7 – A fixed roof above ground storage tank. The tank will store denatured ethanol	39,500 gallons	Not applicable
Unit #25	Cellulose receiving, cellulose transfer, and storage silo loading. Trucks transport cellulose to the ethanol plant and dump the screened cobs into a receiving hopper. A bucket elevator transports the cellulose from the receiving hopper to the storage silo, then to the mill feed bin. Fiber from Unit #3 may also be	20 tons of cellulose per hour	Not applicable

Identification	Description	Maximum Operating Rate	Control Device
	transferred to the feed bin.		
Unit #28	Cellulose pretreatment and fermentation. Ground cellulose and fiber are dropped through the transfer filter separator into two pretreatment vessels. A screw conveyor transfers the cellulose/fiber mixture to six fermentation tanks. The liquid beer is transferred to the beer well associated with Unit #9.	195 pounds of cellulose/fiber solids mix per hour	Wet Scrubber
Unit #30	Tank #8 – A fixed roof above ground storage tank. The tank will store denatured ethanol	39,500 gallons	Not applicable
Unit #31	**Pneumatic Conveyance System**	**0.5 tons fiber per hour**	**Baghouse**
Unit #32	**Natural Gas fired fiber dryer**	**2.5 million Btus per hour**	**Baghouse**
Unit #33	**Surge bin**	**0.3 tons fiber per hour**	**Baghouse**
Unit #34	**Fiber mill and packaging system**	**0.3 tons fiber per hour**	**Baghouse**

5.0 RECORDKEEPING REQUIREMENTS

5.3 **Annual records.** In accordance with ARSD 74:36:05:16.01(9), the owner or operator shall calculate and record the following amounts from January 1 to December 31 of each year:

1. The amount of undenatured ethanol produced in gallons;
2. The amount of natural gas and propane consumed in Units #5, #12, #17, and #18;
3. The amount of grain received (Unit #1), in bushels or pounds;
4. The amount of grain separated (Unit #3), in bushels or pounds;
5. The amount of grain milled (Units #6 and #7), in bushels or pounds;
6. The amount of distillers grain and solubles (dry) produced and shipped (Units #5, #12 and #14) in pounds;
7. The amount of distillers grain and solubles (wet) produced;
8. The amount of denatured ethanol loaded out (Unit #15), in gallons;
9. **The amount of fiber processed (Unit #31, #32, #33, and #34), in tons;**
10. The number of hours each unit in Table #1 operated;
11. The amount of undenatured ethanol produced, in gallons, from the dry corn mill ethanol production plant;
12. The amount of undenatured ethanol produced, in gallons, from the research and development facility (pilot plant); and
13. The amount of cellulose based undenatured ethanol produced in gallons.

The amount of undenatured ethanol produced and the amount fuel consumed shall be based on production records, consumption records, purchase records, etc. The annual records will be used in conjunction with the operational report required in permit condition 2.2.

5.4 Monitoring log. In accordance with ARSD 74:36:05:16.01(9), the owner or operator must maintain a monitoring log. The monitoring log shall contain the following information:

1. Maintenance schedule for the air pollution control equipment specified for Units #3, #4, #6, #7, #8, #9, #11, ~~and~~ #28, **#31, #32, #33, and #34**. At a minimum, the maintenance schedule shall meet the manufacturer's recommended schedule for maintenance. The following information shall be recorded for maintenance:
   a. Identify the unit;
   b. The date and time maintenance was performed;
   c. Description of the type of maintenance;
   d. Reason for performing maintenance; and
   e. Signature of person performing maintenance;
2. The following information shall be recorded for each visible emission reading required in permit condition 19.2:
   a. Identify the unit;
   b. The date and time the visible emission reading was performed;
   c. If visible emissions were observed;
   d. Description of maintenance performed to eliminate visible emissions;
   e. Visible emission evaluation if visible emissions are not eliminated; and
   f. Signature of person performing visible emission reading and/or visible emission evaluation;
3. The water flow rate records for Units #8, #9, #11, and #28 that are required in permit condition 19.1 and the following information pertaining to water flow rates that fall below the desired flow rates for the appropriate wet scrubber on Units #8, #9, #11, and #28:
   a. The date, time and duration the flow rate fell below the desired flow rate;
   b. The reason the flow rate fell below the desired value; and
   c. The maintenance or procedures that were performed to bring the flow rate back above the desired value;
4. The owner or operator shall maintain relevant records of the occurrence and duration of each startup, shutdown, or malfunction of process equipment and/or air pollution control equipment; and;
5. The following information shall be recorded within two days of each emergency exceedance:
   a. The date of the emergency exceedance and the date the emergency exceedance was reported to the Secretary;
   b. The cause(s) of the emergency;
   c. The reasonable steps taken to minimize the emissions during the emergency; and
   d. A statement that the permitted equipment was at the time being properly operated.

~~**5.5 Equipment log.** In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.486(e), the owner or operator shall record the following information for equipment subject to the requirements in chapters 8.0 through 16.0, inclusive, of this permit:~~

~~1. A list of identification numbers for equipment subject to the requirements in chapters 8.0 through 16.0, inclusive, of this permit;~~

2. A list of identification numbers for equipment that are designated for no detectable emissions under the provisions of permit conditions 8.3, 9.3, and 13.2. The designation of equipment for no detectable emissions shall be signed by the responsible official;
3. A list of equipment identification numbers for pressure relief devices required to comply with chapter 10.0 of this permit;
4. The date of each compliance test as required in permit conditions 8.3, 9.3, and 13.2 and chapter 10.0 of this permit. The background level measured during each compliance test and the maximum instrument reading measured at the equipment during the compliance test shall also be recorded; and
5. A list of identification numbers for equipment in vacuum service.

5.6 Identification of unsafe equipment. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-10(l), the owner or operator shall record the following information to identify equipment that is unsafe to inspect:

1. Identification of all parts of the closed vent system that are designated as unsafe to inspect, an explanation of why the equipment is unsafe to inspect, and the plan for inspecting the equipment;
2. Identification of all parts of the closed vent system that are designated as difficult to inspect, an explanation of why the equipment is difficult to inspect, and the plan for inspecting the equipment;
3. For each inspection during which a leak is detected, a record of the information specified in permit condition 5.12;
4. For each inspection conducted in accordance with permit condition 17.9 during which no leaks are detected, a record that the inspection was performed, the date of the inspection, and a statement that no leaks were detected; and
5. For each annual visual inspection required in permit condition 16.1 and conducted in accordance with permit condition 17.9 during which no leaks are detected, a record that the inspection was performed, the date of the inspection, and a statement that no leaks were detected.

5.7 Exempt valve log. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.486(f), the owner or operator shall maintain the following information pertaining to all valves subject to the requirements in permit conditions 13.3 and 13.4:

1. A list of identification numbers for valves that are designated as unsafe-to-monitor, an explanation for each valve stating why the valve is unsafe-to-monitor, and the plan for monitoring each valve; and
2. A list of identification numbers for valves that are designated as difficult-to-monitor, an explanation for each valve stating why the valve is difficult-to-monitor, and the plan for monitoring each valve.

5.8 Design criterion for determining leaks. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.486(h) and (j), the owner or operator shall maintain the following information in a log:

1. Design criterion required in permit conditions 8.2(5) and 9.1(5) and explanation of the design criterion;
2. Any changes to this criterion and the reasons for the changes; and

3. Information and data used to demonstrate that a piece of equipment is not in volatile organic compound service.

5.9 Labeling leaky equipment. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.486(b), if a leak is detected as specified in chapters 8.0, 9.0, 13.0, and 14.0 of this permit, the owner or operator shall attach a weatherproof and readily visible identification tag on the leaking equipment. The identification tag shall be marked with the equipment identification number.

The identification tag for a valve may be removed after the valve has been monitored for two successive months, as specified in permit condition 13.1, and no leak has been detected during those two months. The identification tag for equipment other than valves may be removed after the equipment has been repaired.

5.10 Maintaining a log of equipment leaks. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.486(c), if a leak is detected as specified in chapters 8.0, 9.0, 13.0, and 14.0 of this permit, the owner or operator shall record the following information in a log.

1. The instrument and operator identification numbers and the equipment identification number;
2. The date the leak was detected and the dates of each attempt to repair the leak;
3. The repair methods applied in each attempt to repair the leak;
4. Record "Above 10,000", if the maximum instrument reading measured by the methods specified in permit condition 17.8 after each repair attempt is equal to or greater than 10,000 parts per million;
5. Record "Repair delayed" and the reason for the delay if the leak is not repaired within 15 calendar days after discovery of the leak;
6. The signature of the person whose decision it was that repair could not be completed without a process shutdown;
7. The expected date of successful repair of the leak if the leak is not repaired within 15 calendar days;
8. The dates of process unit shutdown that occur while the equipment is unrepaired; and
9. The date of successful repair of the leak.

5.11 Records for closed vents and control devices. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.486(d), the owner or operator shall maintain the following information pertaining to the design requirements for closed vent systems and control devices described in permit conditions 16.1 through 16.5, inclusive:

1. Detailed schematics, design specifications, and piping and instrumentation diagrams;
2. The dates and descriptions of any change in the design specifications;
3. A description of the parameter or parameters monitored, as required in permit condition 16.1 to ensure that control devices are operated and maintained in conformance with their design and an explanation of why that parameter or parameters was selected for the monitoring;
4. Periods when the closed vent systems and control devices required in chapters 8.0 through 11.0, inclusive, of this permit are not operated as designed; and
5. Dates of startups and shutdowns of the closed vent systems and control devices required in chapters 8.0 through 11.0, inclusive, of this permit.

5.12 Valve log - alternative standards. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.486(g), the owner or operator shall maintain the following information for valves complying with permit condition 13.6:

1. A schedule of monitoring; and
2. The percent of valves found leaking during each monitoring period.

6.0 REPORTING REQUIREMENTS

6.4 Notification of alternative standards for valves. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.487(d), the owner or operator shall notify the Secretary 90 days in advance of electing to implement permit conditions 13.5 and/or 13.6.

6.6 Semiannual reports. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.487(a), (b), and (c) and ARSD 74:36:07:04, as referenced to 40 CFR § 60.49b(h) and (w), the owner or operator shall submit semiannual reports to the Secretary. The semiannual reports shall include a summary of the following information:

1. Name of facility, permit number, reference to this permit condition, identifying the submittal as a semiannual report, and calendar dates covered in the reporting period;
2. The number of valves subject to the requirements in permit condition 13.1, excluding those valves designated for no detectable emissions under the provisions of permit condition 13.2;
3. The number of pumps subject to the requirements in permit conditions 8.1 and 8.2, excluding those pumps designated for no detectable emissions under the provisions of permit condition 8.3 and those pumps complying with permit condition 8.4;
4. The number of compressors subject to the requirements in permit condition 9.1, excluding those compressors designated for no detectable emissions under the provisions of permit condition 9.3 and those compressors complying with permit condition 9.2;
5. The number of valves for which leaks were detected as described in permit conditions 13.1 or 13.6 and the number of valves for which leaks were not repaired as required in permit condition 13.1;
6. The number of pumps for which leaks were detected as described in permit conditions 8.1 and 8.2 and the number of pumps for which leaks were not repaired as required in permit conditions 8.1 and 8.2;
7. The number of compressors for which leaks were detected as described in permit condition 9.1 and the number of compressors for which leaks were not repaired as required in permit condition 9.1;
8. The facts which explain each delay of repair and where appropriate, why an ethanol plant shutdown was technically infeasible; and
9. Dates the ethanol plant was shut down during the semiannual reporting period;
10. Any changes which have occurred since the initial semiannual report or subsequent revisions to the initial semiannual report;

The first semiannual report must be postmarked no later than 30 days after the end of the calendar half in which initial startup occurred. The remaining reports must be postmarked no later than 30 days after the end of the reporting period (i.e., July 30th and January 30th).

7.0 STATE EMISSION LIMITS

7.3 Total suspended particulate matter limits. In accordance with ARSD 74:36:06:02(1) and ARSD 74:36:06:03(1), the owner or operator shall not allow the emission of total suspended particulate matter in excess of the emission limit specified in Table #2 for the appropriate permitted unit, operations, and process:

Table #2
Total Suspended Particulate Emission Limit

Identification	Description	Emission Limit
Unit #3	Fiber/Germ Fractionation System	1.7 lbs/ton
Unit #4	Fiber/Germ Conveyor	3.1 lbs/ton
Unit #5	Germ Dryer	3.8 lbs/ton
Unit #6	2003 Hammer mill	1.7 lbs/ton
Unit #7	1998 Hammer mill	1.8 lbs/ton
Unit #12	DDGS Dryer	2.5 lbs/ton
Unit #13	DDGS Cooling Drum	2.5 lbs/ton
Unit #17	Boiler #1	0.5 lbs/MMBtu heat input
Unit #18	Boiler #2	0.5 lbs/MMBtu heat input
Unit #31	**Pneumatic conveyance system**	**2.6 pounds per hour**
Unit #32	**Fiber dryer**	**3.2 pounds per hour**
Unit #33	**Surge bin**	**1.8 pounds per hour**
Unit #34	**Fiber mill and packaging system**	**1.8 pounds per hour**

7.4 Sulfur dioxide limit. In accordance with ARSD 74:36:06:02(2), the owner or operator shall not allow the emission of sulfur dioxide in excess of the emission limit specified in Table #3 for the appropriate permitted unit, operations, and process:

Table #3
Sulfur Dioxide Emission Limit

Identification	Description	Emission Limit
Unit #5	Germ Dryer	3.0 pounds per million Btu heat input
Unit #12	DDGS Dryer	3.0 pounds per million Btu heat input
Unit #17	Boiler #1	3.0 pounds per million Btu heat input
Unit #18	Boiler #2	3.0 pounds per million Btu heat input
Unit #32	**Fiber dryer**	**3.0 pounds per million Btu heat input**

Compliance with the sulfur dioxide emission limit is based on a three-hour rolling average, which is the arithmetic average of three contiguous one-hour periods.

~~7.7 **Restriction on water treatment chemicals for industrial process cooling towers.** In accordance with ARSD 74:36:08:11, as referenced to 40 CFR §§ 63.402 and 63.404(b), no owner or operator shall use chromium based water treatment chemicals in an industrial process cooling tower. A cooling water sample residual hexavalent chromium concentration in excess of 0.5 parts per million by weight shall be considered a violation.~~

7.12 Plant wide particulate matter limit. In accordance with ARSD 74:36:05:16.01(8), the owner or operator shall not emit into the ambient air greater than or equal to 238 tons of particulate matter per 12-month rolling period. The 12-month rolling total shall be calculated every month using that month's value and the previous 11 months' values.

A short term limit (pounds per hour) is established in Table 7-6 to ensure that the long term limit of 238 tons per 12-month rolling period is not exceeded.

Table #7-6 – ~~VOC~~ Particulate Matter Short Term Limit

Unit	Description	PM Short Term Limit [1]
#3	Germ and fiber fractionation system.	0.01 grains per dry standard cubic foot
#4	Fiber and germ conveyor system.	0.01 grains per dry standard cubic foot
#6	Grain milling.	0.01 grains per dry standard cubic foot
#7	Grain milling.	0.01 grains per dry standard cubic foot
#31	**Pneumatic conveyance system**	**0.01 grains per dry standard cubic foot**
#32	**Fiber dryer**	**0.01 grains per dry standard cubic foot**
#33	**Surge bin**	**0.01 grains per dry standard cubic foot**
#34	**Fiber mill and packaging system**	**0.01 grains per dry standard cubic foot**

[1] – Compliance with the volatile organic compound short term limit is based on the average of three test runs based on the stack testing requirements in Chapter 17.0;

~~8.0 PUMPS IN LIGHT LIQUID SERVICE~~

~~**8.1 Weekly and monthly monitoring of pumps in light liquid service.** In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-2(a), (b) and (c), each pump in light liquid service shall be checked by visual inspection each calendar week for indications of liquids dripping from the pump seal. "In light liquid service" means that the piece of equipment contains a liquid that meets the conditions specified in permit condition 17.11. A leak is detected if there is an indication of liquids dripping from the pump seal.~~

~~Each pump in light liquid service shall be monitored monthly to detect leaks by the method specified in permit condition 17.8. A leak is detected if an instrument reading of 10,000 parts per million or greater is measured.~~

A first attempt at repairing a leak shall be made no later than five calendar days after each leak is detected. A leak shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in permit condition 15.1.

The owner or operator shall comply with this permit condition, except as provided in permit conditions 8.2, 8.3, 8.4, and 18.1.

8.2 Pumps in light liquid service equipped with a dual mechanical seal system exempt from weekly and monthly monitoring. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-2(d), each pump equipped with a dual mechanical seal system that includes a barrier fluid system is exempt from permit condition 8.1 provided the following requirements are met:

1. Each dual mechanical seal system is:
   a. Operated with the barrier fluid at a pressure that is at all times greater than the pump stuffing box pressure;
   b. Equipment with a barrier fluid degassing reservoir that is connected by a closed vent system to a control device that complies with the requirements of chapter 16.0 of this permit; or
   c. Equipped with a system that purges the barrier fluid into a process stream with zero volatile organic compound emissions to the atmosphere;
2. The barrier fluid system is in heavy liquid service or is not in volatile organic compound service;
3. Each barrier fluid system is equipped with a sensor that will detect failure of the seal system, the barrier fluid system, or both. Each sensor shall be checked daily or equipped with an audible alarm;
4. Each pump is checked by visual inspection, each calendar week, for indications of liquids dripping from the pump seals; and
5. The owner or operator determines, based on design considerations and operating experience, a criterion that indicates failure of the seal system, the barrier fluid system, or both.

A leak is detected if there are indications of liquids dripping from the pump seal or the sensor indicates failure of the seal system, the barrier fluid system, or both based on the criterion determined in subsection 5 above. A first attempt at repairing a leak shall be made no later than five calendar days after each leak is detected. A leak shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in permit condition 15.1.

8.3 Pumps in light liquid service with no detectable emissions exempt from monitoring. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-2(e), any pump that is designated by permit condition 5.7(1) and (2) for no detectable emission is exempt from permit conditions 8.1 and 8.2 if the pump:

1. Has no externally actuated shaft penetrating the pump housing;
2. Is demonstrated to be operating with no detectable emissions as indicated by an instrument reading of less than 500 parts per million above background as measured by the methods specified in permit condition 17.9; and
3. Is tested for compliance with subsection 2 initially upon designation, annually, and at other times requested by the Secretary.

8.4 Pumps in light liquid service with a closed vent system exempt from monitoring. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-2(f), any pump equipped with a closed vent system capable of capturing and transporting any leakage from the seal or seals to a control device is exempt from monitoring provided the control device is in compliance with chapter 16.0 of this permit.

9.0 COMPRESSORS

9.1 Compressor seal system. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-3(a) through (g), inclusive, each compressor shall be equipped with a seal system that includes a barrier fluid system and that prevents leakage of volatile organic compounds to the atmosphere. Each compressor seal system and barrier fluid system shall meet the following requirements:

1. Each compressor seal system shall be:
   a. Operated with the barrier fluid at a pressure that is greater than the compressor stuffing box pressure;
   b. Equipped with a barrier fluid system that is connected by a closed vent system to a control device that complies with the requirements in chapter 16.0 of this permit; or
   c. Equipped with a system that purges the barrier fluid into a process stream with zero volatile organic compound emissions to the atmosphere;
2. The barrier fluid system shall be in heavy liquid service or shall not be in volatile organic compound service;
3. The barrier fluid system shall be equipped with a sensor that will detect failure of the seal system, barrier fluid system, or both;
4. Each sensor shall be checked daily or shall be equipped with an audible alarm;
5. The owner or operator shall determine, based on design considerations and operating experience, a criterion that indicates failure of the seal system, the barrier fluid system, or both; and
6. A leak is detected if the sensor indicates failure of the seal system, the barrier system, or both based on the criterion determined in subsection 5. A first attempt at repairing a leak shall be made no later than five calendar days after each leak is detected. A leak shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in permit condition 15.1.

The owner or operator shall comply with this permit condition, except as provided in permit conditions 9.2, 9.3, and 18.1.

9.2 Compressors equipped with a closed vent system exempt from barrier fluid. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-3(h), a compressor equipped with a closed vent system capable of capturing and transporting any leakage from the seal to a control device is exempt from permit condition 9.1. The control device must comply with the requirements of chapter 16.0 of this permit.

9.3 Compressors with no detectable emissions. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-3(i), a compressor that is designated by permit condition 5.7(1) and (2) for no detectable emissions is exempt from permit condition 9.1 and 9.2 if the compressor:

1. Is demonstrated to be operating with no detectable emissions as indicated by an instrument reading of less than 500 parts per million above background as measured by the methods specified in permit condition 17.9; and
2. Is tested for compliance with subsection 1 initially upon designation, annually, and at other times requested by the Secretary.

10.0 PRESSURE RELIEF DEVICE IN GAS/VAPOR SERVICE

10.1 No detectable emissions from a pressure relief device in gas/vapor service. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-4(a) and (b), each pressure relief device in gas/vapor service shall be operated with no detectable emissions, except during pressure releases. "In gas/vapor service" means that the piece of equipment contains process fluid that is in the gaseous state at operating conditions.

No later than five calendar days after each pressure release, except as provided in permit condition 15.1, the pressure relief device shall be monitored to confirm the condition of no detectable emissions. No detectable emissions shall be demonstrated by an instrument reading of less than 500 parts per million above background as determined by the methods specified in permit condition 17.9.

The owner or operator shall comply with this permit condition, except as provided in permit condition 10.2.

10.2 Pressure relief device exemption. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-4(c), any pressure relief device equipped with a closed vent system capable of capturing and transporting leakage through the pressure relief device to a control device is exempt from permit condition 10.1. The control device must comply with the requirements of chapter 16.0 of this permit.

11.0 SAMPLING CONNECTION SYSTEMS

11.1 Sampling connection system. In accordance with ARSD 74:36:07:22 as referenced to 40 CFR § 60.482-5(a) and (b), each sampling connection system shall be equipped with a closed purged, closed loop, or closed vent system. Each closed purged, closed loop, or closed vent system shall comply with the following requirements:

1. Return the purged process fluid directly to the process line;
2. Collect and recycle the purged process fluid to a process; or
3. Be designed and operated to capture and transport all the purged process fluid to a control device that complies with the requirements of chapter 16.0 of this permit.

The owner or operator shall comply with this permit condition, except as provided in permit conditions 11.2 and 18.1.

11.2 In situ sampling systems and sampling systems without purges exempt. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-5(c), in situ sampling systems and sampling systems without purges are exempt from permit condition 11.1. "In situ sampling system" means non-extractive samplers or in-line samplers.

12.0 OPEN-ENDED VALVES OR LINES

12.1 Open-ended valves or lines. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-6(a) and (b), each open-ended valve or line shall be equipped with a cap, blind flange, plug, or a second valve. The cap, blind flange, plugs, or second valve shall seal the open end at all times except during operations requiring process fluid flow through the open-ended valve or line. Each open-ended valve or line equipped with a second valve shall be operated in a manner such that the valve on the process fluid end is closed before the second valve is closed.

The owner or operator shall comply with this permit condition, except as provided in permit conditions 12.2 and 18.1.

12.2 Double block-and-bleed system exemption. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-6(c), when a double block-and-bleed system is being used, the bleed valve or line may remain open during operations that require venting the line between the block valves but shall comply with permit condition 12.1 at all other times.

13.0 VALVES IN GAS/VAPOR SERVICE AND LIGHT LIQUID SERVICE

13.1 Monthly monitoring valves in gas/vapor and light liquid service. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-7(a) through (e), inclusive, each valve shall be monitored monthly to detect leaks by the methods specified in permit condition 17.8. A leak is detected if an instrument reading of 10,000 parts per million or greater is measured. Any valve for which a leak is not detected for two successive months may be monitored the first month of every quarter, beginning with the next quarter, until a leak is detected. Once a leak is detected, the valve shall be monitored monthly again until a leak is not detected for two successive months.

A first attempt at repairing a leak shall be made no later than five calendar days after the leak is detected. The leak shall be repaired as soon as practicable, but not later than 15 calendar days after the leak is detected, except as provided in permit condition 15.1. First attempts at repair include, but are not limited to, the following best practices where practicable:

1. Tightening of bonnet bolts;
2. Replacement of bonnet bolts;
3. Tightening of packing gland nuts; and
4. Injection of lubricant into lubricated packing.

The owner or operator shall comply with this permit condition, except as provided in permit conditions 13.2, 13.3, 13.4, 13.5, 13.6, and 18.1.

13.2 Monitoring valves with no detectable emissions exempt. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-7(f), any valve that is designated by permit condition 5.7(2) for no detectable emissions is exempt from permit condition 13.1 if the valve:

1. Has no external actuating mechanism in contact with the process fluid;
2. Is operated with emissions less than 500 parts per million above background as measured by the methods specified in permit condition 17.9; and

3. Is tested for compliance with subsection 2 initially upon designation, annually, and at other times requested by the Secretary.

13.3 Unsafe-to-monitor valves exempt. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-7(g), any valve that is designated by permit condition 5.9(1) as an unsafe-to-monitor valve is exempt from permit condition 13.1 if:

1. The owner or operator of the valve demonstrates that the valve is unsafe to monitor because monitoring personnel would be exposed to an immediate danger as a consequence of complying with permit condition 13.1; and
2. The owner or operator of the valve adheres to a written plan that requires monitoring of the valve as frequently as practicable during safe-to-monitor times.

13.4 Difficult-to-monitor valves exempt. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-7(h), any valve that is designated by permit condition 5.9(2) as a difficult-to-monitor valve is exempt from permit condition 13.1 if:

1. The owner or operator of the valve demonstrates that the valve cannot be monitored without elevating the monitoring personnel more than two meters above a support surface;
2. The process unit within which the valve is located either becomes an affected facility through a modification or reconstruction or the owner or operator designates less than 3.0 percent of the total number of valves as difficult-to-monitor; and
3. The owner or operator of the valve follows a written plan that requires monitoring of the valve at least once per calendar year.

13.5 Alternative standard for valves in gas/vapor and light liquid service. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.483-1(a), (b), and (d), the owner or operator may elect to comply with permit condition 13.1 with an allowable percentage of valves leaking of equal to or less than 2.0 percent. This can be accomplished by following the requirements listed below:

1. The owner or operator must notify the Secretary that the owner or operator has elected to comply with the allowable percentage of valves leaking before implementing this alternative standard, as specified in permit condition 6.5;
2. A performance test, as specified in permit condition 17.13, shall be conducted initially upon designation, annually, and at other times requested by the Secretary; and
3. If a valve leak is detected, it shall be repaired in accordance with the time frame specified in permit condition 13.1.

The owner or operator who elects to comply with this permit condition shall not have a leak percentage greater than 2.0 percent. If the leak percentage is greater than 2.0 percent, the owner or operator shall comply with the requirements described in permit condition 13.1.

13.6 Additional option for valves in gas/vapor and light liquid service. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.483-2, after complying initially with permit condition 13.1 an owner or operator may elect to comply with one of the alternative work practices listed below after notifying the Secretary in accordance with permit condition 6.5:

1. After two consecutive quarterly leak detection periods with the percent of valves leaking equal to or less than 2.0, an owner or operator may begin to skip one of the quarterly leak detection periods for the valves in gas/vapor and light liquid service; or
2. After five consecutive quarterly leak detection periods with the percent of valves leaking equal to or less than 2.0, an owner or operator may begin to skip three of the quarterly leak detection periods for the valves in gas/vapor and light liquid service.

The percent of valves leaking shall be determined by dividing the sum of valves found leaking during current monitoring and valves for which repair has been delayed by the total number of valves subject to the requirements of this section. If the percent of valves leaking is greater than 2.0, the owner or operator shall comply with permit condition 13.1 but can again elect to use this permit condition. The owner or operator shall keep a record of the percent of valves found leaking during each leak detection period.

14.0 OTHER PUMPS, VALVES, PRESSURE RELIEF DEVICES, FLANGES, AND CONNECTORS

14.1 Monitoring pumps, valves, pressure relief devices, flanges, and other connectors. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-8, the owner or operator shall monitor pumps and valves in heavy liquid service, pressure relief devices in light liquid or heavy liquid service, and flanges and other connectors within five days of detecting a potential leak. Visual, audible, olfactory, or any other detection method may be used to determine a potential leak. A leak is detected if a monitor reading of 10,000 parts per million or greater is measured.

A first attempt at repairing a leak shall be made no later than five calendar days after each leak is detected. A leak shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in permit condition 15.1. First attempts at repair include, but are not limited to the following best practices where practicable:

1. Tightening of bonnet bolts;
2. Replacement of bonnet bolts;
3. Tightening of packing gland nuts; and
4. Injection of lubricant into lubricated packing.

15.0 DELAY OF REPAIR

15.1 Repair delay. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-9, a delay of repair of equipment for which leaks have been detected will be allowed in the following circumstances:

1. A delay may occur if the repair is technically infeasible without a process unit shutdown. Repair of this equipment shall occur before the end of the next process unit shutdown;
2. A delay of repair of equipment will be allowed for equipment which is isolated from the process and which does not remain in volatile organic compound service;
3. A delay of repair for valves will be allowed if:
    a. The owner or operator demonstrates that emissions of purged material resulting from immediate repair are greater than the fugitive emissions likely to result from delay of repair; and

b. When repair procedures are effected, the purged material is collected and destroyed or recovered using a control device complying with chapter 16.0 of this permit;

4. Delay of repair for pumps will be allowed if:
   a. Repair requires the use of a dual mechanical seal system that includes a barrier fluid system; and
   b. Repair is completed as soon as practicable, but not later than six months after the leak was detected; and
5. Delay of repair beyond a process unit shutdown will be allowed for a valve, if valve assembly replacement is necessary during the process unit shutdown, and valve assembly supplies had been sufficiently stocked and have been depleted. Delay of repair beyond the next process unit shutdown will not be allowed unless the next process unit shutdown occurs sooner than six months after the first process unit shutdown.

16.0 CLOSED VENT SYSTEMS AND CONTROL DEVICES

16.1 Standard for a closed vent system and control device. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-10(a), (b), (c), (f), (g), and (m), the owner or operator of a closed vent system and control device shall comply with the following:

1. Vapor recovery systems such as a condenser or adsorber shall be designed and operated to recover the volatile organic compound emissions vented to them with an efficiency of 95 percent or greater;
2. The control device shall be monitored to ensure that the control device is operated and maintained in conformance with its design. In addition, the owner or operator shall monitor the fresh water flow into the control device. The flow rate should be greater than or equal to the flow rate, in gallons per minute, recorded during the latest performance test that demonstrated compliance with this permit condition. The flow rate shall be recorded every two hours when the control device is operating; and
3. Except as provided in permit conditions 16.3, 16.4, and 16.5, each closed vent system shall be inspected according to the following procedures:
   a. If the vapor collection system or closed vent system is constructed of hard piping, the owner or operator shall conduct an initial inspection according to permit condition 17.8 and conduct annual visual inspections for visible, audible, or olfactory indications of leaks; and
   b. If the vapor collection system or closed vent system is constructed of ductwork, the owner or operator shall conduct an initial and annual inspection according to permit condition 17.8.

Leaks as indicated by an instrument reading greater than 500 parts per million by volume above background or by visual inspections, shall be repaired as soon as practicable except as provided in permit condition 16.2. A first attempt at repair shall be made no later than five calendar days after the leak is detected. Repair shall be completed no later than 15 calendar days after the leak is detected.

A closed vent system and control device used to comply with this permit condition shall be operated at all times when emissions may be vented to them.

16.2 Delay in repairing leaks. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-10(h), the owner or operator may delay the repair of a closed vent system for which leaks

have been detected. The delay may occur if the repair is technically infeasible without a process unit shutdown or if the owner or operator determines that emissions resulting from immediate repair would be greater than the fugitive emissions likely to result from delay of repair. The leak shall be repaired by the end of the next process unit shutdown.

16.3 Vapor collection system or closed vent system under vacuum exempt from inspection. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-10(i), the owner or operator is exempt from inspecting a vapor collection system or closed vent system that is operated under a vacuum.

16.4 Unsafe to inspect closed vent system. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-10(j), the owner or operator is exempt from inspecting any part of the closed vent system that is designated, as described in permit condition 5.8, as unsafe to inspect if the owner or operator complies with the following:

1. The owner or operator determines that the equipment is unsafe to inspect because inspection personnel would be exposed to an imminent or potential danger as a consequence of complying with permit condition 16.1(3); and
2. The owner or operator has a written plan that requires inspection of the equipment as frequently as practicable during safe-to-inspect times.

16.5 Difficult to inspect closed vent system. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-10(k), the owner or operator is exempt from inspecting any part of the closed vent system that is designated, as described in permit condition 5.8, as difficult to inspect if the owner or operator complies with the following:

1. The owner or operator determines that the equipment cannot be inspected without elevating the inspection personnel more than two meters above a support surface;
2. The process unit within which the closed vent system is located becomes an affected facility through modification or reconstruction or the owner or operator designates less than 3.0 percent of the total number of closed vent system equipment as difficult to inspect; and
3. The owner or operator has a written plan that requires inspection of the equipment at least once every five years.

17.0 PERFORMANCE TESTS

17.7 Compliance with pumps, compressors, pressure relief devices, and valves. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.485(b), the owner or operator shall demonstrate compliance with chapters 8.0, 9.0, and 10.0 using 40 CFR Part 60, Appendix A, Method 21. Method 21 shall be used to determine the presence of leaking equipment. The instrument shall be calibrated by the procedures specified in Method 21 prior to each day's use. The following calibration gases shall be used:

1. Zero air (less than 10 parts per million of hydrocarbon in air); and
2. A mixture of methane or n-hexane and air at a concentration of about, but less than, 10,000 parts per million methane or n-hexane.

17.8 Compliance with no detectable emission standards. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.485(c), the owner or operator shall demonstrate

~~compliance with permit conditions 8.3, 9.3, 10.1, 13.2, and 16.1 using 40 CFR Part 60, Appendix A, Method 21. Method 21 shall be used to determine the background level and the presence of leaking equipment. The instrument shall be calibrated by the procedures specified in Method 21 prior to each day's use. The following calibration gases shall be used:~~

~~1. Zero air (less than 10 parts per million of hydrocarbon in air); and~~
~~2. A mixture of methane or n-hexane and air at a concentration of about, but less than, 10,000 parts per million methane or n-hexane.~~

~~All potential leak interfaces shall be traversed as close to the interface as possible. The arithmetic difference between the maximum concentration indicated by the instrument and the background level is compared with 500 parts per million for determining compliance.~~

~~**17.9 Demonstrating a process unit is not in volatile organic compound service.** In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.485(d), the owner or operator shall test each piece of equipment unless it is demonstrated that a process unit is not in volatile organic compound series. "Not in volatile organic compound series" would occur if the volatile organic compound content would never be reasonably expected to exceed 10 percent by weight. The following methods shall be followed to demonstrate a process unit is not in volatile organic compound series:~~

~~1. Procedures that conform to the general methods in ASTM E-260, E-168, E-169 shall be used to determine the percent volatile organic compound content in the process fluid that is contained in or contacts a piece of equipment;~~
~~2. Organic compounds that are considered to have negligible photochemical reactivity may be excluded from the total quantity of organic compounds in determining the volatile organic compound content of the process fluid; or~~
~~3. Engineering judgment may be used to estimate the volatile organic compound content, if a piece of equipment had not been shown previously to be in service. If the Secretary disagrees with the judgement, subsections 1 and 2 of this permit condition shall be used to resolve the disagreement.~~

~~**17.10 Demonstrating equipment is light liquid service.** In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.485(e), the owner or operator shall demonstrate equipment is in light liquid service by showing that all of the following conditions apply:~~

~~1. The vapor pressure of one or more of the components is greater than 0.3 kilo Pascal at 20 degrees Celsius. Standard reference texts or ASTM D-2879 shall be used to determine the vapor pressures;~~
~~2. The total concentration of the pure components having a vapor pressure greater than 0.3 kilo Pascal at 20 degrees Celsius is equal to or greater than 20 percent by weight; and~~
~~3. The fluid is a liquid at operating conditions.~~

~~**17.11 Testing representative samples.** In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.485(f), the samples used in conjunction with permit conditions 17.10 and 17.11 shall be representative of the process fluid that is contained in or contacts the equipment.~~

17.12 Performance test for allowable percentage of valves leaking. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.483-1(c), a performance test of the allowable percentage of valves leaking shall be conducted in the following manner:

1. All valves in gas/vapor and light liquid service within the ethanol plant shall be monitored, within one week of the owner or operator notifying the Secretary in accordance with permit condition 13.5, by the testing methods specified in permit condition 17.8;
2. A leak is detected if an instrument reading of 10,000 parts per million or greater is measured; and
3. The leak percentage shall be determined by dividing the number of valves for which leaks are detected by the number of valves in gas/vapor and light liquid service.

17.13 Performance test for volatile organic compounds. In accordance with ARSD 74:36:07:01, the owner or operator shall conduct a performance test on Units #8, #9, #11, #12 and #28 within 180 days after issuance of this permit. The performance tests shall be conducted to determine volatile organic compounds emission rates in pounds per hour for Units #8, #9, #11, #12 and #28 and the control efficiency of Units #8, #9, #11, and #28. The testing will be used to demonstrate compliance with emission limits.

17.14 Performance test methods for volatile organic compounds. In accordance with ARSD 74:36:07:01, the owner or operator shall conduct any performance tests required to determine volatile organic compound emission rates from Units #8, #9, #11, #12 and #28 in accordance with 40 C.F.R. Part 51, Appendix M; Method 207 and 40 C.F.R. Part 60, Appendix A; Method 18. 2,3 Butanediol will be sampled through the chromatography column approximately 2.5 times faster than the maximum allowable sampling rate for the other VOCs in the sampling program (e.g. acetaldehyde, acrolein, and ethyl acetate). This requirement applies only if the Method 207 results indicate that 2,3 Butanediol should be sampled as part of the Method 18 testing. When summing analytes per Method 18, non-detect data will be included in the total VOC mass as one half of the compound method detection limit; except that, if all three performance test runs result in a non-detect measurement and the method detection limit is less than or equal to 1.0 part per million by volume on a dry basis, then all such non-detect data will be treated as zero mass.

18.0 EQUIVALENT LIMITS AND EXEMPTIONS

18.1 Emission limit equivalence. In accordance with ARSD 74:36:07:22, as referenced to 40 CFR §§ 60.482-1(c) and 60.484(a) and (d), the owner or operator may apply to the Administrator of EPA through the Secretary for determination of emission limit equivalence. Emission limit equivalence means the owner or operator shall achieve a reduction in emissions of volatile organic compounds at least equivalent to the reduction in emissions of volatile organic compounds achieved by the controls required in chapters 8.0, 9.0, 11.0, 12.0, 13.0, 14.0, and 16.0 of this permit. An owner or operator may offer a unique approach to demonstrate the equivalence of any equivalent means of emission limit.

If the Administrator of EPA approves the determination of emission limit equivalence, the owner or operator shall comply with the requirements of that determination. The Secretary will use the minor permit amendment procedures to amend this permit to include the requirements of the determination.

~~**18.2 Determination of equivalence to equipment design and operation requirements.** In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.484(b), determination of equivalence to the equipment design and operations requirements of this permit will be evaluated by the following guidelines:~~

~~1. Each owner or operator applying for an equivalence determination shall be responsible for collecting and verifying test data to demonstrate equivalence of means of emission limitation;~~
~~2. The Administrator of EPA will compare test data for the means of emission limitation to test data for the equipment, design, and operational requirements; and~~
~~3. The Administrator of EPA may condition the approval of equivalence on requirements that may be necessary to assure operation and maintenance to achieve the same emission reduction as the equipment, design, and operational requirements. A requirement by the Administrator of EPA that is necessary to assure operation and maintenance to achieve the same emission reduction as the equipment, design, and operational requirements will be added to this permit as a minor permit amendment.~~

~~**18.3 Determination of equivalence to work practices.** In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.484(c), determination of equivalence to the required work practices required by this permit will be evaluated by the following guidelines:~~

~~1. Each owner or operator applying for an equivalence determination shall be responsible for collecting and verifying test data to demonstrate equivalence of means of emission limitation;~~
~~2. The emission reduction achieved by the required work practice shall be demonstrated;~~
~~3. The emission reduction achieved by the equivalent means of emission limitation shall be demonstrated;~~
~~4. The owner or operator shall commit in writing to work practices that provide for emission reductions equal to or greater than the emission reductions achieved by the required work practice;~~
~~5. The Administrator of EPA will compare the demonstrated emission reduction for the equivalent means of emission limitation to the demonstrated emission reduction for the required work practices and will consider the commitment by the owner or operator; and~~
~~6. The Administrator of EPA may condition the approval of equivalence on requirement that may be necessary to assure operation and maintenance to achieve the same emission reduction as the required work practice. A requirement by the Administrator of EPA that assures operation and maintenance to achieve the same emission reduction as the required work practice will be added to this permit as a minor permit amendment.~~

~~**18.4 In vacuum service equipment exemption.** In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-1(d), equipment that is in vacuum service is exempt from the requirements of chapters 8.0, through 16.0, inclusive, of this permit, if the equipment is identified in accordance with permit condition 5.7(5). "In vacuum service" means that equipment is operating at an internal pressure, which is at least five kilo Pascal below ambient pressure.~~

20.0 PREVENTION OF SIGNIFICANT DETERIORATION

20.1 Prevention of significant deterioration review exemption. The owner or operator is exempt from a prevention of significant deterioration review for **particulate matter and** volatile organic compounds. The exemption is based on operational and air emission limits in permit conditions 1.1, 7.5, ~~7.8 through 7.15 through~~ **17.11,** 17.12 and 21.2 through 21.8. Any relaxation

in the permit conditions stated above that increases applicable emissions equal to or greater than 238 tons per 12-month rolling period for the existing operations may require a full prevention of significant deterioration review as though construction had not commenced on the source.

21.0 FLARE OPERATIONAL REQUIREMENTS

21.1 Flare operational limits. In accordance with ARSD 74:36:07:01, as reference to 40 CFR §§ 60.18(c) and 60.18(e), the owner or operator shall conduct the following for the flare in conjunction with Unit #29, as follows:

1. Operate with no visible emissions except for periods not to exceed 5 minutes during any two consecutive hours as determine by permit condition 21.2;
2. Operate with a flame present at all times when the air emissions may be vented to the flare as determined by permit condition 21.3;
3. For a non-assisted flare, operate with a diameter of 3 inches or greater, have a hydrogen content of 8.0 percent or greater and are designed with an exit velocity less than 37.2 meters per second and less than the velocity of permitted maximum velocity. The permitted maximum velocity is determined by permit condition 21.7. The actual exit velocity is determined by permit condition 21.5;
4. For a non-assisted flare, operate only with the net heating value of the gas being combusted being 200 Btu/scf or greater. The net heat value shall be determined by permit condition 21.4;
5. For a steam-assisted or air-assisted flare, operate only with the net heating value of the gas being combusted being 300 Btu/scf or greater. The net heating value shall be determined by permit condition 21.4;
6. For a non-assisted or steam-assisted flare, operate with an exit velocity of 18.3 meters per second or greater as determined by permit condition 21.5 with the following two exceptions:
   a. The exit velocity is greater than 18.3 meters per second but less than 122 meters per second and the gas being burned is greater than 1000 Btu/scf.
   b. The exit velocity is less than the maximum permitted velocity as determined by permit condition 21.8 and less than 122 meters per second.
7. For an air-assisted flare, operate with an exit velocity as determined by permit condition 21.5 less than the maximum permitted velocity as determined by permit condition 21.6.

21.2 Monitoring visible emissions. In accordance with ARSD 74:36:07:01, as reference to 40 CFR § 60.18(f)(1), the owner or operator shall monitor the visible emissions in accordance with 40 CFR Appendix A Method 22.

21.3 Monitoring for a flame. In accordance with ARSD 74:36:07:01, as reference to 40 CFR § 60.18(f)(2), the owner or operator shall monitor the presence of a pilot flame using a thermocouple ro any other equivalent device to detect the presence of a flame.

21.4 Monitoring net heating value. In accordance with ARSD 74:36:07:01, as reference to 40 CFR § 60.18(f)(3), the owner or operator shall monitor the net heating value of the gas being combusted by using the following equation:

$$Ht = K\sum_{i=1}^{n} CiHi$$

~~Where Ht = net heating value of the sample in mega joules per standard cubic meters.~~
~~Ci = concentration of sample component I in parts per million on a wet basis~~
~~Hi = Net heat of combustion of sample component I in kilocalories per gram mole at 25 degrees Celsius and 760 millimeters of mercury~~
~~K = a constant of 0.000000174 gram mole-mega joules per part per million – standard cubic meters - kilocalorie~~

~~**21.5 Monitoring actual exit velocity.** In accordance with ARSD 74:36:07:01, as reference to 40 CFR § 60.18(f)(4), the owner or operator shall monitor the actual exit velocity by dividing the volumetric flow rate as determined by 40 CFR Appendix A Methods 2, 2A, 2C or 2D by the cross sectional area of the flare tip.~~

~~**21.6 Monitoring maximum permit velocity for air-assisted flares.** In accordance with ARSD 74:36:07:01, as reference to 40 CFR § 60.18(f)(6), the owner or operator shall monitor the maximum the following equation:~~

$$V\max = 8.706 + (0.7084)(Ht)$$

~~Where Vmax = maximum permit velocity~~
~~Ht = the net heating value as determined by permit condition 21.4.~~

~~**21.7 Monitoring maximum permit velocity for non-assisted flares.** In accordance with ARSD 74:36:07:01, as reference to 40 CFR § 60.18(c)(3)(i)(A), the owner or operator shall monitor the maximum the following equation:~~

$$V\max = (X - K1)(K2)$$

~~Where Vmax = maximum permit velocity~~
~~X = the volume percent of hydrogen on a wet basis as calculated by ASTM method D1946-77~~
~~K1 = constant of 6.0 volume percent hydrogen~~
~~K2 = constant of 3.9 meters per second per volume percent hydrogen~~

~~**21.8 Monitoring maximum permit velocity for steam-assisted flares.** In accordance with ARSD 74:36:07:01, as reference to 40 CFR § 60.18(c)(3)(i)(A), the owner or operator shall monitor the maximum the following equation:~~

$$Log10(V\max) = (Ht + \_28.8)/(31.7)$$

~~Where Vmax = maximum permit velocity~~
~~Ht = the net heating value as determined by permit condition 21.4.~~

22.0 VVa.0 Synthetic Organic Chemical Manufacturing Requirements

22.1 VVa.1 Addition or replacement of equipment

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.480a(c), the addition or replacement of equipment subject to 40 CFR Part 60 Subpart VVa for the purpose of process improvement which is accomplished without a capital expenditure shall not by itself be considered a modification.

A. PUMPS IN LIGHT LIQUID SERVICE

VVa.2 Monitoring pumps in light liquid service

In accordance with ARSD 74:36:07:22.01, as referenced to 40 CFR § 60.482-2a(a), (b) and (c), each pump in light liquid service shall be monitored according to the following:

1. A visual inspection shall occur each calendar week for indications of liquids dripping from the pump seal. A leak is detected if there is an indication of liquids dripping from the pump seal. If there are indications of liquids dripping from the pump seal, the owner or operator shall meet the following requirements:
   a. Monitor the pump within five days as specified in permit condition VVa.39. If an instrument reading of 2,000 parts per million or greater is measured; a leak is detected; or
   b. Designate the visual indications of liquids dripping as a leak and repair the leak within 15 days of detection by eliminating the visual indications of liquids dripping;
2. An inspection shall occur monthly to detect leaks by the method specified in permit condition VVa.39. A pump that begins operation in light liquid service after the issued permit date of the facility must be monitored for the first time within 30 days of operating in light liquid service, except for a pump that replaces a leaking pump. A leak is detected if an instrument reading of 2,000 parts per million or greater is measured.

"In light liquid service" means the piece of equipment contains a liquid that meets the conditions specified in permit condition VVa.42.

When a leak is detected, the first attempt at repairing a leak shall be made no later than five calendar days after each leak is detected. First attempts at repair include, but are not limited to tightening the packing gland nuts and ensuring the seal flush is operating at design pressure and temperature where practicable. A leak shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in permit condition VVa.27.

The owner or operator shall comply with this permit condition, except as provided in permit condition VVa.3, VVa.4, VVa.5, VVa.6, and VVa.34.

VVa.3 Exemption for pumps equipped with a dual mechanical seal system

In accordance with ARSD 74:36:07:22.01, as referenced to 40 CFR § 60.482-2a(d), each pump in light liquid service equipped with a dual mechanical seal system that includes a barrier fluid system is exempt from permit condition VVa.2 provided the following requirements are met:

1. Each dual mechanical seal system is:
   a. Operated with the barrier fluid at a pressure that is at all times greater than the pump stuffing box pressure;
   b. Equipped with a barrier fluid degassing reservoir that is connected by a closed vent system to a control device that complies with the requirements of permit condition VVa.28 through VVa.33, inclusive; or

c. Equipped with a system that purges the barrier fluid into a process stream with zero volatile organic compound emissions to the atmosphere;

2. The barrier fluid system is in heavy liquid service or is not in volatile organic compound service;
3. Each barrier fluid system is equipped with a sensor that will detect failure of the seal system, the barrier fluid system, or both.
4. Each pump is checked by visual inspection, each calendar week, for indications of liquids dripping from the pump seals. If there are indications of liquids dripping from the pump seal, the owner or operator shall follow the procedures specified below prior to the next required inspection:
   a. Monitor the pump within five days as specified in permit condition VVa.39 to determine if there is a leak of volatile organic compounds in the barrier fluid. If an instrument reading of 2,000 parts per million or greater is measured, a leak is detected. If a leak is detected, the first attempt at repairing a leak shall be made no later than five calendar days after detecting a leak. First attempts at repair include, but are not limited to tightening the packing gland nuts and ensuring the seal flush is operating at design pressure and temperature where practicable. The leak shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in permit condition VVa.27; or
   b. Designate the visual indications of liquids dripping as a leak. If the owner or operator designates a leak, the leak shall be repaired with 15 days of detection by eliminating visual indications of liquids dripping; and
5. The owner or operator determines, based on design considerations and operating experience, a criterion that indicates failure of the seal system, the barrier fluid system, or both. Each sensor described in subsection (3) of this permit condition shall be checked daily or equipped with an audible alarm. If a leak is detected, the owner or operator shall eliminate the conditions that activated the sensor within 15 days of detection.

VVa.4 Exemptions for pumps with no detectable emissions

In accordance with ARSD 74:36:07:22.01, as referenced to 40 CFR § 60.482-2a(e), any pump in light liquid service that is designated by permit condition VVa.50 for no detectable emissions, as indicated by an instrument reading of less than 500 parts per million above background, is exempt from permit condition VVa.2 and VVa.3 if the pump:

1. Has no externally actuated shaft penetrating the pump housing;
2. Is demonstrated to be operating with no detectable emissions as indicated by an instrument reading of less than 500 parts per million above background as measured by the methods specified in permit condition VVa.40; and
3. Is tested for compliance with subsection (2) of this permit condition initially upon designation, annually, and at other times requested by the Secretary.

VVa.5 Exemption for pumps with a closed vent system

In accordance with ARSD 74:36:07:22.01, as referenced to 40 CFR § 60.482-2a(f), any pump in light liquid service equipped with a closed vent system capable of capturing and transporting any leakage from the seal or seals to a process, fuel gas system, or control device that complies with the requirements in permit condition VVa.28 through VVa.33, inclusive, is exempt from permit condition VVa.2, VVa.3, and VVa.4.

VVa.6 Exemption for pumps designated unsafe-to-monitor

In accordance with ARSD 74:36:07:22.01, as referenced to 40 CFR § 60.482-2a(g), any pump in light liquid service that is designated, as described in permit condition VVa.51 as an unsafe-to-monitor pump is exempt from the monitoring and inspection requirements in permit condition VVa.2 and VVa.3 if:

1. **The owner or operator of the pump demonstrates the pump is unsafe-to-monitor because monitoring personnel would be exposed to an immediate danger as a consequence of complying with permit condition VVa.2; and**
2. **The owner or operator of the pump has a written plan that requires monitoring of the pump as frequently as practicable during safe-to-monitor times but not more frequently than the periodic monitoring schedule otherwise applicable. When a leak is detected, the first attempt at repairing the leak shall be made no later than five calendar days after the leak is detected. First attempts at repair include, but are not limited to tightening the packing land nuts and ensuring the seal flush is operating at design pressure and temperature where practicable. A leak shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in permit condition VVa.27.**

B. COMPRESSORS

VVa.7 Compressor seal system

In accordance with ARSD 74:36:07:22.01, as referenced to 40 CFR § 60.482-3a(a) through (g), inclusive, each compressor shall be equipped with a seal system that includes a barrier fluid system and prevents leakage of volatile organic compounds to the atmosphere. Each compressor seal system and barrier fluid system shall meet the following requirements:

1. **Each compressor seal system shall be:**
   d. **Operated with the barrier fluid at a pressure that is greater than the compressor stuffing box pressure;**
   e. **Equipped with a barrier fluid system degassing reservoir that is routed to a process or fuel gas system or connected by a closed vent system to a control device that complies with the requirements in permit condition VVa.28 through VVa.33, inclusive; or**
   f. **Equipped with a system that purges the barrier fluid into a process stream with zero volatile organic compound emissions to the atmosphere;**
2. **The barrier fluid system shall be in heavy liquid service or shall not be in volatile organic compound service;**
3. **The barrier fluid system shall be equipped with a sensor that will detect failure of the seal system, barrier fluid system, or both;**
4. **Each sensor shall be checked daily or shall be equipped with an audible alarm;**
5. **The owner or operator shall determine, based on design considerations and operating experience, a criterion that indicates failure of the seal system, the barrier fluid system, or both;**
6. **A leak is detected if the sensor indicates failure of the seal system, the barrier system, or both based on the criterion determined in subsection (5) of this permit condition;**
7. **When a leak is detected, a first attempt at repairing a leak shall be made no later than five calendar days after each leak is detected. A leak shall be repaired as soon as**

practicable, but not later than 15 calendar days after it is detected, except as provided in permit condition VVa.27.

The owner or operator shall comply with this permit condition, except as provided in permit condition VVa.8, VVa.9, and VVa.34.

VVa.8 Exemption for compressors equipped with a closed vent system

In accordance with ARSD 74:36:07:22.01, as referenced to 40 CFR § 60.482-3a(h), a compressor equipped with a closed vent system capable of capturing and transporting leakage from the compressor drive shaft back to a process, fuel gas system, or control device that complies with the requirements in permit condition VVa.28 through VVa.33, inclusive, except as provided in permit condition VVa.9, is exempt from permit condition VVa.7.

VVa.9 Exemption for compressors with no detectable emissions

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-3a(i), a compressor that is designated, as described by permit condition VVa.50 for no detectable emissions is exempt from permit condition VVa.7 and VVa.8 if the compressor:

1. Is demonstrated to be operating with no detectable emissions, as indicated by an instrument reading of less than 500 parts per million above background, as measured by the methods specified in permit condition VVa.40; and
2. Is tested for compliance with subsection (1) of this permit condition initially upon designation, annually, and at other times requested by the Secretary.

C. PRESSURE RELIEF DEVICE IN GAS/VAPOR SERVICE

VVa.10 No detectable emissions from a pressure relief device in gas/vapor service

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-4a(a) and (b), except during pressure releases, each pressure relief device in gas/vapor service shall be operated with no detectable emissions, as indicated by an instrument reading of less than 500 parts per million above background, as determined by the methods specified in permit condition VVa.40. "In gas/vapor service" means the piece of equipment contains process fluid that is in the gaseous state at operating conditions.

No later than five calendar days after each pressure release, except as provided in permit condition VVa.27, the pressure relief device shall be returned to a condition of no detectable emissions and monitored to confirm the condition of no detectable emissions.

The owner or operator shall comply with this permit condition, except as provided in permit condition VVa.11 and VVa.12.

VVa.11 Exemption for pressure relief device equipped with closed vent system

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-4a(c), any pressure relief device that is routed to a process or fuel gas system or equipped with a closed vent system capable of capturing and transporting leakage through the pressure relief device to a control device is exempt from permit condition VVa.10. The control device must comply with the requirements of permit condition VVa.28 through VVa.33, inclusive.

VVa.12 Exemption for pressure relief device equipped with rupture disk

In accordance with ARSD 74:36:07:22.01, as referenced to 40 CFR § 60.482-4a(d), any pressure relief device equipped with a rupture disk upstream of the pressure relief device is exempt from permit condition VVa.10 provided the owner or operator installs a new rupture disk after each pressure release as soon as practicable, but no later than five calendar days after each pressure release, except as provide in permit condition VVa.27.

D. SAMPLING CONNECTION SYSTEMS

VVa.13 Sampling connection system

In accordance with ARSD 74:36:07:22:01 as referenced to 40 CFR § 60.482-5a(a) and (b), each sampling connection system shall be equipped with a closed purged, closed loop, or closed vent system. Each closed-purged, closed-loop, or closed vent system shall comply with the following requirements:

1. **Gases displaced during the filling of the sample container are not required to be collected or captured;**
2. **Containers that are part of the closed-purge system must be covered or closed when not being filled or emptied;**
3. **Gases remaining in the tubing or piping between the closed-purge system valve(s) and sample container valve(s) after the valves are closed and the sample container is disconnected are not required to be collected or captured;**
4. **Each closed-purge, closed-loop, or closed-vent system shall be designed and operated to meet one of the following requirements:**
   a. **Return the purged process fluid directly to the process line;**
   b. **Collect and recycle the purged process fluid to a process;**
   c. **Capture and transport all of the purged process fluid to a control device that complies with the requirements of permit condition VVa.28 through VVa.33, inclusive; or**
   d. **Collect, store, and transport the purged process fluid to any of the following systems or facilities:**
      i. **A waste management unit as defined in 40 CFR § 63.111, if the waste management unit is subject to and operated in compliance with the provisions of 40 CFR Part 63, Subpart G, applicable to Group 1 wastewater streams;**
      ii. **A treatment, storage, or disposal facility subject to regulation under 40 CFR Part 262, 264, 265, or 266;**
      iii. **A facility permitted, licensed, or registered by a state to manage municipal or industrial solid waste, if the process fluids are not hazardous waste as defined in 40 CFR Part 261;**
      iv. **A waste management unit subject to and operated in compliance with the treatment requirements of 40 CFR § 61.348(a), provided all waste management units that collect, store, or transport the purged process fluid to the treatment unit are subject to and operated in compliance with the management requirements of 40 CFR §§ 61.343 through 61.347, inclusive; or**
      v. **A device used to burn off-specification used oil for energy recovery in accordance with 40 CFR Part 279, Subpart G, provided the purged process fluid is not hazardous waste as defined in 40 CFR Part 261.**

The owner or operator shall comply with this permit condition, except as provided in permit condition VVa.14 and VVa.34.

VVa.14 Exemption for in situ sampling systems and sampling systems without purges

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-5a(c), in situ sampling systems and sampling systems without purges are exempt from permit condition VVa.13. "In-situ sampling system" means non-extractive samplers or in-line samplers.

E. OPEN-ENDED VALVES OR LINES

VVa.15 Open-ended valves or lines

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-6a(a) and (b), each open-ended valve or line shall be equipped with a cap, blind flange, plug, or a second valve. The cap, blind flange, plugs, or second valve shall seal the open end at all times except during operations requiring process fluid flow through the open-ended valve or line. Each open-ended valve or line equipped with a second valve shall be operated in a manner such that the valve on the process fluid end is closed before the second valve is closed.

The owner or operator shall comply with this permit condition, except as provided in permit condition VVa.16, VVa.17, VVa.18, and VVa.34.

VVa.16 Exemption for double block-and-bleed system

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-6a(c), when a double block-and-bleed system is being used, the bleed valve or line may remain open during operations that require venting the line between the block valves but shall comply with permit condition VVa.15 at all other times.

VVa.17 Exemption for emergency shutdown

In accordance with ARSD 74:36:07:22.01, as referenced to 40 CFR § 60.482-6a(d), open-ended valves or lines in an emergency shutdown system which are designed to open automatically in the event of a process upset are exempt from permit condition VVa.15 and VVa.16.

VVa.18 Exemption for safety hazards

In accordance with ARSD 74:36:07:22.01, as referenced to 40 CFR § 60.482-6a(e), open-ended valves or lines containing materials which would auto catalytically polymerize or would present an explosion, serious overpressure, or other safety hazard if capped or equipped with a double block and bleed system are exempt from permit condition VVa.15 and VVa.16.

F. VALVES IN GAS/VAPOR SERVICE AND LIGHT LIQUID SERVICE

VVa.19 Monthly monitoring valves in gas/vapor and light liquid service

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-7a(a) through (e), inclusive, each valve shall be monitored monthly to detect leaks by the methods specified in permit condition VVa.39. A valve that begins operation in gas/vapor service or light liquid service after the issued permit date for the facility must be monitored for the first time within 30 days after the valve begins operation in gas/vapor service or light liquid

service, except for a valve that replaces a leaking valve. If the existing valves in the process unit are monitored in accordance with permit condition VVa.23 or VVa.24, count the new valve as leaking when calculating the percentage of valves leaking as described in permit condition VVa.45. If less than 2.0 percent of the valves are leaking for that process unit, the valve must be monitored for the first time during the next scheduled monitoring event for existing valves in the process unit or within 90 days, whichever comes first. A leak is detected if an instrument reading of 500 parts per million or greater is measured.

Any valve for which a leak is not detected for two successive months may be monitored the first month of every quarter, beginning with the next quarter, until a leak is detected. Once a leak is detected, the valve shall be monitored monthly again until a leak is not detected for two successive months. As an alternative to monitoring all of the valves in the first month of a quarter, an owner or operator may elect to subdivide the process unit into 2 or 3 subgroups of valves and monitor each subgroup in a different month during the quarter, provided each subgroup is monitored every 3 months. The owner or operator must keep records of the valves assigned to each subgroup.

A first attempt at repairing a leak shall be made no later than five calendar days after the leak is detected. The leak shall be repaired as soon as practicable, but not later than 15 calendar days after the leak is detected, except as provided in permit condition VVa.27. First attempts at repair include, but are not limited to, the following best practices where practicable:

1. **Tightening of bonnet bolts;**
2. **Replacement of bonnet bolts;**
3. **Tightening of packing gland nuts; and**
4. **Injection of lubricant into lubricated packing.**

The owner or operator shall comply with this permit condition, except as provided in permit condition VVa.20, VVa.21, VVa.22, VVa.23, VVa.25, and VVa.34.

VVa.20 Exemption for monitoring valves with no detectable emissions

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-7a(f), any valve that is designated by permit condition VVa.50 for no detectable emissions, as indicated by an instrument reading of less than 500 parts per million above background, is exempt from permit condition VVa.19 if the valve:

1. **Has no external actuating mechanism in contact with the process fluid;**
2. **Is operated with emissions less than 500 parts per million above background as measured by the methods specified in permit condition VVa.40; and**
3. **Is tested for compliance with subsection (2) of this permit condition initially upon designation, annually, and at other times requested by the Secretary.**

VVa.21 Exemption for unsafe-to-monitor valves

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-7a(g), any valve that is designated by permit condition VVa.51 as an unsafe-to-monitor valve is exempt from permit condition VVa.19 if:

1. **The owner or operator of the valve demonstrates the valve is unsafe to monitor because monitoring personnel would be exposed to an immediate danger as a consequence of complying with permit condition VVa.19; and**
2. **The owner or operator of the valve adheres to a written plan that requires monitoring of the valve as frequently as practicable during safe-to-monitor times.**

VVa.22 Exemption for difficult-to-monitor valves

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-7a(h), any valve that is designated by permit condition VVa.51 as a difficult-to-monitor valve is exempt from permit condition VVa.19 if:

1. **The owner or operator of the valve demonstrates that the valve cannot be monitored without elevating the monitoring personnel more than two meters above a support surface;**
2. **The process unit within which the valve is located either becomes an affected facility through a modification or reconstruction or the owner or operator designates less than 3.0 percent of the total number of valves as difficult-to-monitor; and**
3. **The owner or operator of the valve follows a written plan that requires monitoring of the valve at least once per calendar year.**

VVa.23 Alternative standard for valves in gas/vapor and light liquid service

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.483-1a(a), (b), and (d), the owner or operator may elect to comply with permit condition VVa.19 with an allowable percentage of valves leaking of equal to or less than 2.0 percent. This can be accomplished by following the requirements:

1. **The owner or operator must notify the Secretary that the owner or operator has elected to comply with the allowable percentage of valves leaking before implementing this alternative standard, as specified in permit condition VVa.57;**
2. **A performance test, as specified in permit condition VVa.24, shall be conducted initially upon designation, annually, and at other times requested by the Secretary; and**
3. **If a valve leak is detected, it shall be repaired in accordance with the time frame specified in permit condition VVa.19.**

The owner or operator who elects to comply with this permit condition shall not have a leak percentage greater than 2.0 percent, determined as described in permit condition VVa.45.

VVa.24 Performance test for valves using alternative standard

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.483-1a(c), if the owner or operator elects to use the alternative standard for valves in permit condition VVa.23, a performance test shall be conducted in the following manner:

1. **All valves in gas/vapor and light liquid service within the ethanol plant shall be monitored within one week by the methods specified in permit condition VVa.39;**
2. **A leak is detected if an instrument reading of 500 parts per million or greater is measured; and**

3. The leak percentage shall be determined by dividing the number of valves for which leaks are detected by the number of valves in gas/vapor and light liquid service.

VVa.25 Additional option for valves in gas/vapor and light liquid service

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.483-2a, after complying initially with permit condition VVa.19, an owner or operator may elect to comply with one of the alternative work practices listed below after notifying the Secretary in accordance with permit condition VVa.57:

1. After two consecutive quarterly leak detection periods with the percent of valves leaking equal to or less than 2.0, an owner or operator may begin to skip one of the quarterly leak detection periods for the valves in gas/vapor and light liquid service; or
2. After five consecutive quarterly leak detection periods with the percent of valves leaking equal to or less than 2.0, an owner or operator may begin to skip three of the quarterly leak detection periods for the valves in gas/vapor and light liquid service.

The percent of valves leaking shall be determined by permit condition VVa.45. If the percent of valves leaking is greater than 2.0, the owner or operator shall comply with permit condition VVa.19 but can again elect to use this permit condition. The owner or operator shall keep a record of the percent of valves found leaking during each leak detection period.

A valve that begins operation in gas/vapor service or light liquid service after the initial startup of this facility must be monitored in accordance with permit condition VVa.19 before the provisions of this permit condition can be applied to that valve.

G. OTHER PUMPS, VALVES, PRESSURE RELIEF DEVICES, AND CONNECTORS

VVa.26 Monitoring pumps, valves, pressure relief devices, and other connectors

In accordance with ARSD 74:36:07:22.01, as referenced to 40 CFR § 60.482-8a, if evidence of a potential leak is found by visual, audible, olfactory, or any other detection method at pumps, valves, and connectors in heavy liquid service and pressure relief devices in light liquid or heavy liquid service, the owner or operator shall comply with one of the following procedures:

1. Monitor the equipment within five days by the method specified in permit condition VVa.39. A leak is detected if a monitor reading of 10,000 parts per million or greater is measured. When a leak is detected, it shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in permit condition VVa.27. A first attempt at repairing a leak shall be made no later than five calendar days after each leak is detected. First attempts at repair include, but are not limited to the following best practices where practicable:
   a. Tightening of bonnet bolts;
   b. Replacement of bonnet bolts;
   c. Tightening of packing gland nuts;
   d. Ensuring the seal flush is operating at design pressure and temperature; and
   e. Injection of lubricant into lubricated packing; or
2. Eliminate the visual, audible, olfactory, or other indications of potential leak within five calendar days of detection.

H. DELAY OF REPAIR

VVa.27 Repair delay

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-9a, a delay of repair of equipment for which leaks have been detected will be allowed in the following circumstances:

1. **Delay may occur if the repair within 15 days is technically infeasible without a process unit shutdown. Repair of this equipment shall occur before the end of the next process unit shutdown. Monitoring to verify repair must occur within 15 days after startup of the process unit;**
2. **Delay of repair of equipment will be allowed for equipment which is isolated from the process and which does not remain in volatile organic compound service;**
3. **Delay of repair for valves and connectors will be allowed if:**
   c. **The owner or operator demonstrates that emissions of purged material resulting from immediate repair are greater than the fugitive emissions likely to result from delay of repair; and**
   d. **When repair procedures are effected, the purged material is collected and destroyed or recovered using a control device complying with permit condition VVa.28 through VVa.33, inclusive;**
4. **Delay of repair for pumps will be allowed if:**
   c. **Repair requires the use of a dual mechanical seal system that includes a barrier fluid system; and**
   d. **Repair is completed as soon as practicable, but not later than six months after the leak was detected; and**
6. **Delay of repair beyond a process unit shutdown will be allowed for a valve, if valve assembly replacement is necessary during the process unit shutdown and valve assembly supplies had been sufficiently stocked and have been depleted. Delay of repair beyond the next process unit shutdown will not be allowed unless the next process unit shutdown occurs sooner than six months after the first process unit shutdown.**

When delay of repair is allowed for a leaking pump, valve, or connector that remains in service, the pump, valve, or connector may be considered to be repaired and no longer subject to this chapter if two consecutive monthly monitoring instrument readings are below the leak definition.

I. CLOSED VENT SYSTEMS AND CONTROL DEVICES

VVa.28 Standard for a closed vent system and control device

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-10a (a), (b), (c), (d), (e), (f), (g), and (m), the owner or operator of a closed vent system and control device used to comply with chapter VVa.0 of this permit shall comply with the following:

1. **Vapor recovery systems such as a condenser or adsorber shall be designed and operated to recover the volatile organic compound emissions vented to them with an efficiency of 95 percent or greater or to an exit concentration of 20 parts per million by volume, whichever is less stringent;**

2. **An enclosed combustion device shall be designed and operated to reduce volatile organic compound emissions vented to them with an efficiency of 95 percent or greater or to an exit concentration of 20 parts per million by volume, on a dry basis, corrected to 3 percent oxygen, whichever is less stringent or provide a minimum residence time of 0.75 seconds at a minimum temperature of 816 degrees Celsius (1,500 degrees Fahrenheit);**
3. **A flare shall comply with the requirements in 40 CFR § 60.18;**
4. **The control device shall be monitored to ensure the control device is operated and maintained in conformance with its design; and**
5. **Except as provided in permit condition VVa.30, VVa.31, and VVa.32, each closed vent system shall be inspected according to the following procedures:**
    a. **If the vapor collection system or closed vent system is constructed of hard piping, the owner or operator shall conduct an initial inspection according to permit condition VVa.39 and conduct an annual visual inspections for visible, audible, or olfactory indications of leaks; and**
    b. **If the vapor collection system or closed vent system is constructed of ductwork, the owner or operator shall conduct an initial and annual inspection according to permit condition VVa.39.**

Leaks as indicated by an instrument reading greater than 500 parts per million by volume above background or by visual inspections, shall be repaired as soon as practicable except as provided in permit condition VVa.29. A first attempt at repair shall be made no later than five calendar days after the leak is detected. Repair shall be completed no later than 15 calendar days after the leak is detected.

A closed vent system and control device used to comply with this permit condition shall be operated at all times when emissions may be vented to them.

VVa.29 Delay in repairing leaks

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-10a(h), the owner or operator may delay the repair of a closed vent system for which leaks have been detected. The delay may occur if the repair is technically infeasible without a process unit shutdown or if the owner or operator determines that emissions resulting from immediate repair would be greater than the fugitive emissions likely to result from delay of repair. The leak shall be repaired by the end of the next process unit shutdown.

VVa.30 Exemption for vapor collection system or closed vent system under vacuum

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-10a(i), the owner or operator of a vapor collection system or closed vent system that is operated under a vacuum is exempt from subsection (5) of permit condition VVa.28.

VVa.31 Exemption for unsafe to inspect closed vent system

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-10a(j), the owner or operator is exempt from subsection (5) of permit condition VVa.28 for any part of the closed vent system that is designated as unsafe to inspect, as described in permit condition VVa.33, if the owner or operator complies with the following:

1. **The owner or operator determines the equipment is unsafe to inspect because inspection personnel would be exposed to an imminent or potential danger as a consequence of complying with subsection (5) of permit condition VVa.28; and**
2. **The owner or operator has a written plan that requires inspection of the equipment as frequently as practicable during safe-to-inspect times.**

VVa.32 Exemption for difficult to inspect closed vent system

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-10a(k), the owner or operator is exempt from inspecting any part of the closed vent system that is designated as difficult to inspect, as described in permit condition VVa.33, if the owner or operator complies with the following:

1. **The owner or operator determines the equipment cannot be inspected without elevating the inspection personnel more than two meters above a support surface;**
2. **The process unit within which the closed vent system is located becomes an affected facility through modification or reconstruction or the owner or operator designates less than 3.0 percent of the total number of closed vent system equipment as difficult to inspect; and**
3. **The owner or operator has a written plan that requires inspection of the equipment at least once every five years.**

VVa.33 Identification of unsafe and difficult to inspect equipment

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-10a(l), the owner or operator shall record the following information to identify equipment unsafe or difficult to inspect:

1. **Identification of all parts of the closed vent system that are designated as unsafe to inspect, an explanation of why the equipment is unsafe to inspect, and the plan for inspecting the equipment;**
2. **Identification of all parts of the closed vent system that are designated as difficult to inspect, an explanation of why the equipment is difficult to inspect, and the plan for inspecting the equipment;**
3. **For each inspection during which a leak is detected, a record of the information specified in permit condition VVa.48;**
4. **For each inspection conducted in accordance with permit condition VVa.39 during which no leaks are detected, a record that the inspection was performed, the date of the inspection, and a statement that no leaks were detected; and**
5. **For each annual visual inspection required in subsection (5)(b) of permit condition VVa.28 during which no leaks are detected, a record that the inspection was performed, the date of the inspection, and a statement that no leaks were detected.**

J. EQUIVALENT LIMITS AND EXEMPTIONS

VVa.34 Emission limit equivalence

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR §§ 60.482-1a(c) and 60.484a(a) and (d), the owner or operator may apply to the Administrator of EPA through the Secretary for determination of emission limit equivalence. Emission limit equivalence means the owner or operator shall achieve a reduction in emissions of volatile organic compounds at least equivalent to the reduction in emissions of volatile organic compounds

achieved by the controls required in permit condition VVa.2 through VVa.9, VVa.13 through VVa.26 and VVa.28 through VVa.33, inclusive. An owner or operator may offer a unique approach to demonstrate the equivalence of any equivalent means of emission limit. If the Administrator of EPA approves the determination of emission limit equivalence, the owner or operator shall comply with the requirements of that determination.

VVa.35 Determination of equivalence to equipment design and operation requirements

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.484a(b), determination of equivalence to the equipment, design, and operational requirements will be evaluated by the following guidelines:

1. **Each owner or operator applying for an equivalence determination shall be responsible for collecting and verifying test data to demonstrate equivalence of means of emission limitation;**
2. **The Administrator of EPA will compare test data for the means of emission limitation to test data for the equipment, design, and operational requirements; and**
3. **The Administrator of EPA may condition the approval of equivalence on requirements that may be necessary to assure operation and maintenance to achieve the same emission reduction as the equipment, design, and operational requirements.**

VVa.36 Determination of equivalence to work practices

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.484a(c), determination of equivalence to the required work practices will be evaluated by the following guidelines:

1. **Each owner or operator applying for an equivalence determination shall be responsible for collecting and verifying test data to demonstrate equivalence of means of emission limitation;**
2. **The emission reduction achieved by the required work practice shall be demonstrated;**
3. **The emission reduction achieved by the equivalent means of emission limitation shall be demonstrated;**
4. **The owner or operator shall commit in writing to work practices that provide for emission reductions equal to or greater than the emission reductions achieved by the required work practice;**
5. **The Administrator of EPA will compare the demonstrated emission reduction for the equivalent means of emission limitation to the demonstrated emission reduction for the required work practices and will consider the commitment by the owner or operator; and**
6. **The Administrator of EPA may condition the approval of equivalence on requirement that may be necessary to assure operation and maintenance to achieve the same emission reduction as the required work practice.**

VVa.37 In vacuum service equipment exemption

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR §§ 60.482-1a(d), equipment in vacuum service is exempt from the requirements of permit condition VVa.28 through VVa.33, inclusive, if the equipment is identified in accordance with subsection (5) of

permit condition VVa.50. "In vacuum service" means equipment is operating at an internal pressure which is at least five kilo Pascal below ambient pressure.

VVa.38 Temporarily in VOC service exemption

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-1a(e), equipment an owner or operator designates as being in volatile organic compound service less than 300 hours per year is excluded from the requirements of permit condition VVa.2 through VVa.33, inclusive, if it is identified as required in permit condition VVa.50(6) and it meets any of the following specifications:

1. **The equipment is in volatile organic compound service only during startup and shutdown, excluding startup and shutdown between batches of the same campaign for a batch process;**
2. **The equipment is in volatile organic compound service only during process malfunctions or other emergencies; or**
3. **The equipment is backup equipment that is in volatile organic compound service only when the primary equipment is out of service.**

K. TEST METHODS FOR 40 CFR PART 60, SUBPART VVa

VVa.39 Determining presence of leaking equipment

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.485a(b), the owner or operator shall demonstrate compliance with permit condition VVa.2 through VVa.33, inclusive, by using 40 CFR Part 60, Appendix A, Method 21. Method 21 shall be used to determine the presence of leaking equipment. The instrument shall be calibrated by the procedures specified in Method 21 prior to each day's use. The following calibration gases shall be used:

1. **Zero air (less than 10 parts per million of hydrocarbon in air); and**
2. **A mixture of methane or n-hexane and air at a concentration no more than 2,000 parts per million greater than the leak definition concentration of the equipment monitored. If the monitoring instrument's design allows for multiple calibration scales, then the lower scale shall be calibrated with a calibration gas that is no higher than 2,000 parts per million above the concentration specified as a leak, and the highest scale shall be calibrated with a calibration gas that is approximately equal to 10,000 parts per million. If only one scale on an instrument will be used during monitoring, the owner or operator need not calibrate the scales that will not be used during that day's monitoring.**

A calibration drift assessment shall be performed, at a minimum, at the end of each monitoring day. Check the instrument using the same calibration gas or gases used to calibrate the instrument before use. Follow the procedures specified in 40 CFR Part 60, Appendix A, Method 21, except do not adjust the meter readout to correspond to the calibration gas value. Record the instrument reading for each scale used as specified in permit condition VVa.50(7). Calculate the average algebraic difference between the three meter readings and the most recent calibration value. Divide this algebraic difference by the initial calibration value and multiply by 100 to express the calibration drift as a percentage. If any calibration drift assessment shows a negative drift of more than 10 percent from the initial calibration value, then all equipment monitored since the last calibration with

instrument readings below the appropriate leak definition and above the leak definition multiplied by (100 minus the percent of negative drift/divided by 100) must be re-monitored. If any calibration drift assessment shows a positive drift of more than 10 percent from the initial calibration value, then, at the owner's or operator's discretion, all equipment since the last calibration with instrument readings above the appropriate leak definition and below the leak definition multiplied by (100 plus the percent of positive drift/divided by 100) may be re-monitored.

VVa.40 Compliance with no detectable emission standards

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.485a(c), the owner or operator shall demonstrate compliance with the no detectable emission standard in permit condition VVa.3, VVa.9, VVa.10, VVa.20, and VVa.28 using 40 CFR Part 60, Appendix A, Method 21. Method 21 shall be used to determine the background level and the presence of leaking equipment. The instrument shall be calibrated by the procedures specified in permit condition VVa.39. All potential leak interfaces shall be traversed as close to the interface as possible. The arithmetic difference between the maximum concentration indicated by the instrument and the background level is compared with 500 parts per million for determining compliance.

VVa.41 Demonstrating a process unit is not in volatile organic compound service

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.485a(d), the owner or operator shall test each piece of equipment unless it is demonstrated that a process unit is not in volatile organic compound service. "Not in volatile organic compound service" would occur if the volatile organic compound content would never be reasonably expected to exceed 10 percent by weight. The following methods shall be followed to demonstrate a process unit is not in volatile organic compound service:

1. **Procedures that conform to the general methods in ASTM E260-73, 91, or 96, E168-67, 77, or 92, E169-63, 77 or 93 shall be used to determine the percent volatile organic compound content in the process fluid that is contained in or contacts a piece of equipment;**
2. **Organic compounds that are considered to have negligible photochemical reactivity may be excluded from the total quantity of organic compounds in determining the volatile organic compound content of the process fluid; or**
3. **Engineering judgment may be used to estimate the volatile organic compound content, if a piece of equipment had not been shown previously to be in service. If the Secretary disagrees with the judgment, subsections (1) and (2) of this permit condition shall be used to resolve the disagreement.**

VVa.42 Demonstrating equipment is light liquid service

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.485a(e), the owner or operator shall demonstrate equipment is in light liquid service by showing that all of the following conditions apply:

1. **The vapor pressure of one or more of the components is greater than 0.3 kilo Pascal at 20 degrees Celsius (1.2 inches of water at 68 degrees Fahrenheit). Standard reference texts or ASTM D-2879-83, 96, or 97 shall be used to determine the vapor pressures;**

2. The total concentration of the pure organic components having a vapor pressure greater than 0.3 kilo Pascal at 20 degrees Celsius (1.2 inches of water at 68 degrees Fahrenheit) is equal to or greater than 20 percent by weight; and
3. The fluid is a liquid at operating conditions.

VVa.43 Testing representative samples

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.485a(f), the samples used in conjunction with permit condition VVa.41, VVa.42, and VVa.44 shall be representative of the process fluid that is contained in or contacts the equipment or the gas being combusted in a flare.

VVa.44 Determining compliance with standards for flares

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.485a(g), the owner or operator shall determine compliance with the standards of flares as follows:

1. 40 CFR Part 60, Appendix A, Method 22 shall be used to determine visible emissions;
2. A thermocouple or any other equivalent device shall be used to monitor the presence of a pilot flame in the flare;
3. The maximum permitted velocity for air assisted flares shall be computed using Equation V-1;
4. The net heat value (H_T) of the gas being combusted in a flare shall be computed using Equation V-2;
5. 40 CFR Part 60, Appendix A, Method 18 or ASTM D6420–99 (2004) (where the target compound(s) are those listed in Section 1.1 of ASTM D6420–99, and the target concentration is between 150 parts per billion by volume and 100 parts per million by volume) and ASTM D2504–67, 77 or 88 (Reapproved 1993) shall be used to determine the concentration of sample component "i";
6. ASTM D2382–76 or 88 or D4809 shall be used to determine the net heat of combustion of component "i" if published values are not available or cannot be calculated; and
7. 40 CFR Part 60, Appendix A, Method 2, 2A, 2C, or 2D, as appropriate, shall be used to determine the actual exit velocity of a flare. If needed, the unobstructed (free) cross-section area of the flare tip shall be used

Equation V-1 – Maximum permitted velocity for air assisted flares

$$V_{max} = K_1 + K_2 H_T$$

Where:

- V_{max} = Maximum permitted velocity, meters per second (feet per second);
- H_T = Net heating value of the gas being combusted, mega Joules per standard cubic meter (Btus per standard cubic foot);
- K_1 = 8.706 meters per second (28.56 feet per second); and
- K_2 = 0.7084 m^4/ mega Joules-seconds (0.087 ft^4 per Btus-second).

Equation V-2 – Net heating value of gas combusted in flare

$$H_T = K \sum_{i=1}^{n} C_i H_i$$

Where:

- H_T = Net heating value of the gas being combusted, mega Joules per standard cubic meter (Btus per standard cubic foot);

- **K = Conversion constant, 1.740 x 10^{-7} (gram-mole)(mega Joules)/parts per million-standard cubic meter-kcal) (4.674 x 10^{-6} (gram-mole)(Btu)/parts per million-standard cubic feet-kcal)); and**
- **Ci = Concentration of sample component "i", parts per million; and**
- **Hi = Net heat of combustion of sample component "i" at 25 degrees Celsius and 760 millimeters Mercury (77 degrees Fahrenheit and 14.7 pounds per square inch), kcal/gram-mole.**

VVa.45 Demonstrating compliance with alternative standards for valves

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.485a(h), the owner or operator shall determine compliance with permit condition VVa.23 and VVa.25 as follows:

1. **The percent of valves leaking shall be determined using Equation V-3;**
2. **The total number of valves monitored shall include difficult-to-monitor and unsafe-to-monitor valves only during the monitoring period in which those valves are monitored;**
3. **The number of valves leaking shall include valves for which repair has been delayed;**
4. **Any new valve that is not monitored within 30 days of being placed in service shall be included in the number of valves leaking and the total number of valves monitored for the monitoring period in which the valve is placed in service;**
5. **If the process unit has been subdivided in accordance with permit condition VVa.19 related to alternative valve monitoring on a quarterly basis, the sum of valves found leaking during a monitoring period includes all subgroups; and**
6. **The total number of valves monitored does not include a valve monitored to verify repair.**

Equation V-3 – Percent of valves leaking

$$\%V_L = (V_L \div V_T) \times 100$$

Where:

- **$\%V_L$ = Percent leaking valves;**
- **V_L = Number of valves found leaking; and**
- **V_T = The sum of the total number of valves monitored.**

L. RECORDKEEPING FOR 40 CFR PART 60, SUBPART VVa

VVa.46 Monitoring event

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.486a(a)(3), the owner or operator shall record the following information for each monitoring event required in permit condition VVa.2 through VVa.9 and VVa.19 through VVa.26, inclusive:

1. **Monitoring instrument identification;**
2. **Operator identification;**
3. **Equipment identification;**
4. **Date of monitoring; and**
5. **Instrument reading.**

VVa.47 Labeling leaky equipment

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.486a(b), if a leak is detected as specified in permit condition VVa.2 through VVa.9 and VVa.19 through VVa.26, inclusive, the owner or operator shall attach a weatherproof and readily visible identification tag on the leaking equipment. The identification tag shall be marked with the equipment identification number. The identification tag for a valve may be removed after the valve has been monitored for two successive months, as specified in permit condition VVa.19, and no leak has been detected during those two months. The identification on a connector may be removed after is as been monitored within 90 days after a repair is completed to confirm the connector is no longer leaking. The identification tag for equipment other than valves may be removed after the equipment has been repaired.

VVa.48 Maintaining a log of equipment leaks

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.486a(c), if a leak is detected as specified in permit condition VVa.2 through VVa.9 and VVa.19 through VVa.26, inclusive, the owner or operator shall record the following information in a log and shall be kept for two years in a readily accessible location:

1. **The instrument and operator identification numbers and the equipment identification number, except when indications of liquids dripping from a pump are designated as a leak;**
2. **The date the leak was detected and the dates of each attempt to repair the leak;**
3. **The repair methods applied in each attempt to repair the leak;**
4. **Maximum instrument reading measured by 40 CFR Part 60, Appendix A, Method 21 at the time the leak is successfully repaired or determined to be non-repairable, except when a pump is repaired by eliminating indications of liquids dripping;**
5. **Record "Repair delayed" and the reason for the delay if the leak is not repaired within 15 calendar days after discovery of the leak;**
6. **The signature of the person whose decision it was that repair could not be completed without a process shutdown;**
7. **The expected date of successful repair of the leak if the leak is not repaired within 15 calendar days;**
8. **The dates of process unit shutdown that occur while the equipment is unrepaired; and**
9. **The date of successful repair of the leak.**

VVa.49 Records for closed vents and control devices

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.486a(d), the owner or operator shall maintain the following information pertaining to the design requirements for closed vent systems and control devices described in permit condition VVa.28 through VVa.33, inclusive. The records shall be kept in a readily accessible location:

1. **Detailed schematics, design specifications, and piping and instrumentation diagrams;**
2. **The dates and descriptions of any change in the design specifications;**
3. **A description of the parameter or parameters monitored, as required in permit condition VVa.28 to ensure that control devices are operated and maintained in conformance with their design and an explanation of why that parameter or parameters was selected for the monitoring;**

4. **Periods when the closed vent systems and control devices required in permit condition VVa.2 through VVa.14, inclusive, are not operated as designed, including periods when a flare pilot light does not have a flame; and**
5. **Dates of startups and shutdowns of the closed vent systems and control devices required in permit condition VVa.2 through VVa.14, inclusive.**

VVa.50 Equipment log

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.486a(e), the owner or operator shall record the following information for equipment subject to the requirements in permit condition VVa.2 through VVa.33 and VVa.58 through VVa.62, inclusive. The records shall be kept in a readily accessible location:

1. **A list of identification numbers for equipment subject to the requirements in permit condition VVa.2 through VVa.33, inclusive;**
2. **A list of identification numbers for equipment that are designated for no detectable emissions under the provisions of permit condition VVa.3, VVa.9, and VVa.20. The designation of equipment for no detectable emissions shall be signed by the responsible official;**
3. **A list of equipment identification numbers for pressure relief devices required to comply with permit condition VVa.10 through VVa.12, inclusive;**
4. **The date of each compliance test as required in permit condition VVa.3, VVa.9, and VVa.20. The background level measured during each compliance test and the maximum instrument reading measured at the equipment during the compliance test shall also be recorded;**
5. **A list of identification numbers for equipment in vacuum service;**
6. **A list of identification numbers for equipment the owner or operator designates as operating in volatile organic compound service less than 300 hours per year in accordance with permit condition VVa.38, a description of the conditions under which the equipment is in volatile organic compound service, and rationale supporting the designation that it is in volatile organic compound service less than 300 hours per year;**
7. **The date and results of the weekly visual inspection for indications of liquids dripping from pumps in light liquid service;**
8. **Records of the following information for monitoring instrument calibrations conducted according to permit condition VVa.39:**
   a. **Date of calibration and initials of operator performing calibrations;**
   b. **Calibration gas cylinder identification, certification date, and certified concentration;**
   c. **Instrument scale or scales used;**
   d. **A description of any corrective action taken if the meter readout could not be adjusted to correspond to the calibration gas value in accordance with 40 CFR Part 60, Appendix A, Method 21;**
   e. **Results of each calibration drift assessment required by permit condition VVa.39 (e.g., instrument reading for calibration at end of monitoring day and the calculated percent difference from the initial calibration value);**
   f. **If an owner or operator makes their own calibration gas, a description of the procedures used; and**
9. **Records of each release from a pressure relief device subject to permit condition VVa.7 through VVa.9, inclusive; and**

10. The connector monitoring schedule as noted in permit condition VVa.59.

VVa.51 Exempt valve and pump log

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.486a(f), the owner or operator shall maintain a log readily accessible of the following information pertaining to all valves subject to the requirements in permit condition VVa.21 and VVa.22, all connectors subject to requirements of permit condition VVa.61 and all pumps subject to the requirements of permit condition VVa.6:

1. A list of identification numbers for valves and pumps that are designated as unsafe-to-monitor, an explanation for each valve or pump stating why the valve or pump is unsafe-to-monitor, and the plan for monitoring each valve or pump; and
2. A list of identification numbers for valves that are designated as difficult-to-monitor, an explanation for each valve stating why the valve is difficult-to-monitor, and the plan for monitoring each valve.

VVa.52 Valve log - alternative standards

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.486a(g), the owner or operator shall maintain the following information for valves complying with permit condition VVa.25:

1. A schedule of monitoring; and
2. The percent of valves found leaking during each monitoring period.

VVa.53 Design criterion for determining leaks

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.486a(h), the owner or operator shall maintain the following information in a log that is kept in a readily accessible location:

1. Design criterion required in permit condition VVa.2(5) and VVa.7(5) and explanation of the design criterion; and
2. Any changes to this criterion and the reasons for the changes.

VVa.54 Log for equipment in VOC service

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.486a(j), the owner or operator shall maintain the information and data used to demonstrate that a piece of equipment is not in volatile organic compound service in a log that is kept in a readily accessible location.

M. REPORTING FOR PUMPS, VALVES, AND COMPRESSORS

VVa.55 Initial report for pumps, valves, and compressors

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.487a(a) and (b), the owner or operator shall submit an initial report to the Secretary within 180 days of the issued permit date of the facility. The initial report shall include a summary of the following information:

1. Name of facility, permit number, reference to this permit condition, and identifying the submittal as the initial report;

2. **The number of valves subject to the requirements of permit condition VVa.19 through VVa.25, inclusive, excluding those valves designated for no detectable emissions under permit condition VVa.20;**
3. **The number of pumps subject to the requirements of permit condition VVa.2 through VVa.6, inclusive, excluding those pumps designated for no detectable emissions under permit condition VVa.4 and those pumps complying with permit condition VVa.5;**
4. **The number of connectors subject to the requirements of permit conditions VVa.58 and VVa.59; and**
5. **The number of compressors subject to the requirements of permit condition VVa.7 through VVa.9, inclusive, excluding those compressors designated for no detectable emissions under permit condition VVa.9 and those compressors complying with permit condition VVa.8.**

VVa.56 Semiannual report for pumps, valves, and compressors

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.487a(a) and (c), the owner or operator shall submit a semiannual report to the Secretary. The semiannual reports shall include a summary of the following information:

1. **Name of facility, permit number, reference to this permit condition, identifying the submittal as a semiannual report, and calendar dates covered in the reporting period;**
2. **The number of valves for which leaks were detected as described in permit condition VVa.19 or VVa.25 and the number of valves for which leaks were not repaired as required in permit condition VVa.19;**
3. **The number of pumps for which leaks were detected as described in permit condition VVa.2 and VVa.3 and the number of pumps for which leaks were not repaired as required in permit condition VVa.2 and VVa.3;**
4. **The number of compressors for which leaks were detected as described in permit condition VVa.7 and the number of compressors for which leaks were not repaired as required in permit condition VVa.7;**
5. **The number of connectors for which leaks were detected as described in permit condition VVa.59 and the number of connectors for which leaks were not repaired as required in permit condition VVa.59;**
6. **The facts which explain each delay of repair and where appropriate, why the fermenter shutdown was technically infeasible;**
7. **Dates the process unit(s) was shut down during the semiannual reporting period; and**
8. **Any changes which have occurred since the initial report or subsequent revisions to the initial report;**

The semiannual reports must be postmarked no later than 30 days after the end of the reporting period (e.g., July 30th and January 30th).

VVa.57 Notification of alternative standards for valves

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.487a(d), the owner or operator shall notify the Secretary 90 days in advance of electing to implement permit condition VVa.23 and/or VVa.25.

N. CONNECTORS IN GAS/VAPOR SERVICE AND IN LIGHT LIQUID SERVICE

VVa.58 Initial monitoring for connectors

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-11a(a), (b), and (d) each connector shall be monitored within 12 months after the issued permit date to detect leaks by the methods specified in permit conditions VVa.39 and VVa.40. A leak is detected if an instrument reading of 500 parts per million or greater is measured.

A first attempt at repairing a leak shall be made no later than five calendar days after the leak is detected. The leak shall be repaired as soon as practicable, but not later than 15 calendar days after the leak is detected, except as provided in permit condition VVa.27. The leaking connector shall be re-monitored within 90 days after a repair is completed to confirm the connector is no longer leaking.

The owner or operator shall comply with this permit condition, except as provided in permit condition VVa.28, VVa.34, VVa.61, or VVa.62.

VVa.59 Subsequent monitoring for connectors

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-11a(b) and (d) each connector shall be monitored periodically according the following schedule:

1. **If the percent of leaking connectors monitored during the current monitoring periods was greater than or equal to 0.5 percent, the owner or operator shall monitor each connector within one year from the end of the current monitoring period;**
2. **If the percent of leaking connectors monitored during the current monitoring period was greater than or equal to 0.25 percent but less than 0.5 percent, the owner or operator shall monitor each connector within four years from the end of the current monitoring period. An owner or operator may comply with this requirement by monitoring 40 percent of the connectors within two years from the end of the current monitoring period provided all connectors have been monitored within the four year period; or**
3. **If the percent of leaking connectors monitored during the current monitoring period was less than 0.25 percent, then monitor at least 50 percent of the connectors within four years from the end of the current monitoring period and follow one of the following schedules:**
    a. **If the percent of leaking connectors monitored during the current monitoring period was greater than or equal to 0.35 percent, then monitor the connectors that have not been monitored during this current monitoring period within the next six months; or**
    b. **If the percent of leaking connectors monitored during the current monitoring period was less than 0.35 percent, then monitor the connectors that have not been monitored within the next four years (i.e. within eight years from the beginning of the current monitoring period.**

At the end of the current monitoring period, the percent of leaking connectors shall be determined by permit condition VVa.60. The percent leaking connectors determine the timeline for the subsequent monitoring period. A leak is detected if an instrument reading of 500 parts per million or greater is measured.

A first attempt at repairing a leak shall be made no later than five calendar days after the leak is detected. The leak shall be repaired as soon as practicable, but not later than 15 calendar days after the leak is detected, except as provided in permit condition VVa.27. The leaking connector shall be re-monitored within 90 days after a repair is completed to confirm the connector is no longer leaking.

The owner or operator shall comply with this permit condition, except as provided in permit condition VVa.28, VVa.34, VVa.61, or VVa.62.

VVa.60 Percent Leaking Connectors
In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-11a(c), the owner or operator shall determine the percent leaking connectors for the current monitoring period by the equation V-4.

Equation V-4 – Percent of connectors leaking
$$\%C_L = (C_L \div C_T) \times 100$$
Where:

- **$\%C_L$ = Percent leaking connectors;**
- **C_L = Number of connectors found leaking; and**
- **C_T = The sum of the total number of valves monitored during the monitoring period.**

VVa.61 Exemption for unsafe-to-monitor connectors
In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-11a(e), any connector that is designated by permit condition VVa.51 as an unsafe-to-monitor valve is exempt from permit condition VVa.58 and/or VVa.59 if:

1. **The owner or operator of the connector demonstrates the connector is unsafe to monitor because monitoring personnel would be exposed to an immediate danger as a consequence of complying with permit condition VVa.58 and/or VVa.59; and**
2. **The owner or operator of the connector adheres to a written plan that requires monitoring of the connector as frequently as practicable during safe-to-monitor times.**

VVa.62 Exemption for inaccessible, ceramic, or ceramic-lined connectors
In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-11a(f), any connector that is inaccessible or that is ceramic or ceramic-lined (e.g. porcelain, glass, or glass-line) is exempt from permit condition VVa.58 and/or VVa.59. An inaccessible connector is on that meets one of the following conditions:

1. **Buried;**
2. **Insulated in a matter that prevents access to the connector by a monitor probe;**
3. **Obstructed by equipment or piping that prevents access to the connector by a monitor probe;**
4. **Unable to be reached from a wheeled scissor-lift or hydraulic-type scaffold that would allow access to connectors up to 7.6 meters (25 feet) above the ground;**

5. **Inaccessible because it would require elevating the monitoring personnel more than 2 meters (7 feet) above a permanent support surface or would require the erection of scaffold; or**
6. **Not able to be accessed at any time in a safe manner to perform monitoring. Unsafe access includes, but is not limited to, the use of a wheeled scissor-lift on unstable or uneven terrain, the use of a motorized man-lift basket in areas where an ignition potential exists, or access would require near proximity to hazards such as electrical lines, or would risk damage to equipment.**

If an inaccessible, ceramic, or ceramic-lined connector is observed by visual, audible, olfactory, or other means to be leaking, the visual, audible, olfactory, or other indications of a leak to the atmosphere shall be eliminated as soon as practical.